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USDA Forest Service Protocols for Delineation of Economic Impact Analysis Areas

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Table of Contents

Introduction

The USDA-Forest Service conducts economic impact analyses in response to issues raised by the public at all levels of planning and at all levels of the agency. A critical step in each analysis is determining the geographic area that provides functional economic integrity. In the past, the agency has often relied upon Component Economic Areas (CEAs) developed the Bureau of Economic Analysis to provide that base. However, these areas have an urban focus, whereas many impact analyses conducted by the Forest Service address economic issues in rural areas. This is especially true in the West. Forest Service economists have attempted to define smaller, more responsive economic areas by using "gut feel" or "best judgment" to delineate the boundaries. With recent reductions of economic expertise in the agency, the need for more rigorous, well-defined protocols that define economic analysis areas has emerged. This document provides detailed protocols and examples to provide Forest Service analysts with objective guidance for delineating geographic areas appropriate for economic impact analysis required by law, regulation, agency direction, or public interest.

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There are three components to designing a successful economic impact analysis: issues, tools, and analysis area delineation. All three should be aligned for the most effective analysis. Each is introduced below.

The theoretical basis for defining economic areas is founded on labor and trade relationships. "Functional economic areas" (FEAs) have a legacy of being labor-based, while central place theory (CPT) offers a more holistic concept of trade. Industrial clusters or agglomeration theory provides a different view of economic areas that is defined more narrowly and by a variety of external economies of scale. See "**Economic Area Delineation: Identifying Areas for Economic Impact Analysis in the USDA-Forest Service**" for details. Because each theory explains economic relationships with a different focus, each one also suggests a different geographic area. This distinction is particularly evident when comparing labor-based (FEA) and trade-based (CPT) concepts. While industrial clusters have geographic boundaries, they center on the intensity and complexity of trade flows within an area rather than the extent of the area. Because labor is a strong component of most industrial clusters, labor market concepts (FEA) offer a credible means for identifying the analysis area. Ultimately, analysts should focus on either FEA or CPT concepts for area delineation.

Input-output (I-O) models are the preferred analysis tool for most economic impact analysis done in the Forest Service. IMPLAN® is the data/software tool primarily used by the agency, having its origin in the Forest Service. I-O models describe the linkages between elements of a regional economy and predict effects based on these linkages. Relationships between business production, household income, and household spending – captured in "induced effects" – is an important part of each I-O model. These labor and income flows align strongly with the FEA concept. Relationships among industries as they trade goods and services with each other – captured in “indirect effects” – is another important part of each model. These trade flows align strongly with the CPT concept. Model results are very dependent upon analysis area delineation. Therefore, an analysis of labor and income should be matched with an area defined by labor market (FEA) concepts and an analysis of production inputs should be matched with an area defined by trade flow (CPT) concepts.

All analyses start with particular issues or questions to be addressed. Most economic impact issues facing Forest Service managers can be divided into the same two categories noted above: labor or income based, and trade based. Labor and income based issues are by far the most common. These should be addressed using labor flow based (FEA) analysis areas. When trade flow issues are raised, trade flow (CPT) analysis areas should be used by the analyst.

Protocols in this document begin with the classification of economic impact issues – Step 1, then proceed to the delineation of a corresponding analysis area – Step 2 or 3.

Step 1 – Issue Identification

An economic impact analysis area is determined by the classification of economic issues. The classification provides a divide that fundamentally defines the focus of analysis. The primary question is:

> Are the issues fundamentally concerned with labor and income, or are they concerned with business interactions?

If labor and income dominate, then an analysis area based on labor markets and commuting patterns drives the delineation. If business interactions dominate, then an analysis area based on the flow of goods and services (commodities) drives the delineation.

If neither issue category dominates, then both must be addressed for the project or program being analyzed. In these cases, the analyst should develop one analysis area for each basic issue category. If the analyst determines that the geographic areas are substantially alike, then a single area may be used for the entire impact analysis. If the resulting analysis areas are not substantially alike, two separate analyses should be conducted, each using their respective geographic areas.

If the issues are general in nature, such as “consider the local economic impacts of the alternatives,” use an analysis area based on labor markets and commuting patterns.

The above approach to analysis area definition is not resource dependent. A change in production for any resource – regardless of whether it is timber, minerals, grazing, special uses, or recreation – may affect labor markets and/or business interactions. While one resource, such as recreation, may be traditionally aligned with labor market issues, it would be unwise to permanently exclude the potential for local concerns about business interactions.

The classification of economic issues and topics generally follow the outline below:

Labor and income flows (labor markets)

- Jobs
    - *Number*
    - *Occupational types*
    - *Seasonality*
    - *Full-time/part-time*
- Income
    - *Per job (“livable wages”)*
    - *Community wealth*
- Commuting
    - *Distance &/or time*
    - *Bedroom communities*

- Housing
    - *Affordability*
    - *Availability*
- Labor force
    - *Unemployment rate*
    - *Available skills*
    - *Training programs for new skills*

Business interactions (commodity markets)

- Supporting industries (supply chains)
- Economic development
    - *New/additional economic “drivers”*
    - *Value-added or “forward linkage” industries*
    - *Plugging economic “leaks”*
- Business retention

The best time to clarify economic impact issues is during the NEPA scoping process. Context within written and oral comments is often key to determining the intended meaning of somewhat vague or generally stated economic issues. Classification of the issues will be easier and subsequent analyses will be more effective when comments are clearly understood.

Clarification of economic issues may also require discussions or correspondence with community leaders, state officials, and other interested parties, especially when their comments are unclear. The purpose of these discussions is to clarify and isolate the relevant issues so that subsequent analyses are focused. There are occasions where community leaders may be hesitant or unable to narrow the scope of their issues. The analyst must be open to whatever issue(s) the community expresses, yet diligent in seeking clarification. Distinguishing among the topics listed above is critical for determining the analysis area and subsequent impact analysis. Because economic development comments may be vague, it is important that local and/or state development professionals are part of the dialog in narrowing relevant issues.

Economic impact effects are classified three ways: direct, indirect, and induced. Induced effects are those impacts resulting from the local spending of household income. Traditionally, the income originates from economic “drivers” or engines in the local economy. However, this income can originate from any income source outside the study area, including government transfer payments (e.g. social security, Medicare, welfare) and personal investment income (e.g. retirement accounts, pensions). Induced effects are strongly connected with labor markets, and thus align with labor-based issues. Indirect effects are those impacts resulting from local spending by businesses to acquire inputs (goods and services, commodities) into their production process. Wood fiber provided to sawmills and pulpmills, forage provided to cattle ranching, and pipelines provided to oil and gas production are all examples of critical inputs into production processes. Indirect effects are determined by the ability of an area to provide goods and services needed for local production processes, and thus align with commodity trade flows.

Once the issues have been identified, analysis area delineation can proceed. For labor and income issues, follow the labor market protocol in Step 2. For business interaction issues, follow the trade flow protocol in Step 3.

Step 2 - Labor Market Protocol

The purpose of this protocol is to delineate analysis areas for issues that are classified primarily as labor-based (employment and income).

Start with a proposed analysis area of one or more counties where project- or program-related business transactions are likely to occur. NFS land ownership is not necessarily a reliable guide when considering the location of business transactions. Follow the procedure outlined in Table 1 to generate a "Labor Shed Analysis" report.

Table 1. Procedures to generate a "Labor Shed Analysis" report using LED OnTheMap.

Step	**Screen Window**	**Tabs**	**Analysis Tab Details**	**Actions**
1	Browser Window			Go to http://lehdmap3.did.census.gov/themap3/
2	Opening Window			In "Place Name" enter the name of a county or state of interest. Do not enter "county" or "state" after the name.
3	Map Window	Search		Select one of the states or counties from the left-hand list. Center & size the map by dragging with the mouse & using the zoom tool
4		Map Key		No action, information only.
5		Layers		Check the desired boxes.
6		Analysis	Data Settings	Within "**Live or Work**", select "**Workplace Area**"; Within "**Years**", select the most recent; Within "**Job Type**", select "**All Jobs**", Accept remaining defaults; Click NEXT
7		Analysis	Study Area Selection	Click on "**Layer**", select "**Counties**" from pull-down menu, click "**Points**" button. On the map, click once inside each county of interest. Once "Area Shape" outline appears, verify selection. If incorrect, click in "Clear Selection" button and repeat steps. When finished, click NEXT.
8		Analysis	Advanced Area Selection	Click NEXT.
9		Analysis	Map Overlay/ Report	Enter "Report Title" as desired. Select "**Labor Shed Analysis**". Click "GO!"
10		Results Tab		Verify that map results appear reasonable. If they are not, repeat steps 3-9 as needed. View Report in desired form by clicking on format link. Select Excel format for saving results; select PDF format for quick viewing & printing.
11				Determine analysis area by using criteria that follow this table.

Examine the share column of "Job Counts in Counties Where Workers Live" portion of "Labor Shed Analysis" report. Use the following criteria to determine the best area for conducting economic impact analyses.

General circumstances

1. The larger the cumulative share of jobs, the more comprehensive the impact assessment will be. Using the "Labor Shed Analysis Report", start with the first county listed and add counties in the order given until the cumulative share of job count is at least 60% of total, subject to the following:
   a. Counties that add at least 25% to the share of local jobs should always be included.
   b. Counties that add less than 25% may be included in the area, but require further examination before the determination is made. Run a "Commute Shed Analysis" report for each of these counties. A "Commute Shed Analysis" shows where workers are employed who live in the selection area. A "Labor Shed Analysis" shows where workers live who are employed in the selection area. See Table 2 below for details. If at least 25% of the resident workers are employed within the proposed analysis area, add the county in the delineation. If it does not meet this test, exclude the county from the proposed analysis area.
2. If a county selected by the analyst is not listed in the "Labor Shed Analysis" report, or listed with a very small share of total jobs, consider the following:
   a. A very small, rural county may be strongly connected to the area but have few workers and consequently a very small share of total job counts. Verify this by running a "Commute Shed Analysis" report. If at least 25% of the resident workers are employed within their own county or other counties selected by the analyst for the proposed analysis area, retain the county in the delineation. If the county does not meet this test, remove the county from the proposed analysis area.

Table 2. Procedures to generate a "Commute Shed Analysis" report using LED OnTheMap.

Step	**Screen Window**	**Tabs**	**Analysis Tab Details**	**Actions**
1-5				Same as shown in Table 1
6		Analysis	Data Settings	Within "**Live or Work**", select "**Home/Residential Area**"; Within "**Years**", select the most recent; Within "**Job Type**", select "**All Jobs**", Accept remaining defaults; Click NEXT
7		Analysis	Study Area Selection	To clear any previous counties, click in "**Clear Selection**" button. Click on "**Layer**", select "**Counties**" from pull-down menu, click "**Points**" button. On the map, click once inside each county of interest. Once "**Area Shape**" outline appears, verify selection. If incorrect, click in "**Clear**

				Selection" button and repeat steps. When finished, click NEXT.
8		Analysis	Advanced Area Selection	Click NEXT.
9		Analysis	Map Overlay/Report	Enter "Report Title" as desired. Select "**Commute Shed Analysis**". Click "GO!"
10		Results Tab		Verify that map results appear reasonable. If they are not, repeat steps 3-9 as needed. View Report in desired form by clicking on format link. Select Excel format for saving results; select PDF format for quick viewing & printing.
11				Determine analysis area by using criteria that follow this table.

3. Do not include urban counties in the analysis areas. See the discussion under "Urban National Forests" for more details regarding identification of urban or metropolitan areas. Metro counties should not be included when the issue is focused on labor markets between more rural or non-metropolitan counties. Including highly populated metro counties generally masks economic impact consequences desired when analyzing smaller rural counties.

See the Rochester RD and Jackson RD examples for basic applications of this protocol.

Urban National Forests

Delineating analysis areas for urban national forests can be especially difficult. Most urban national forests include lands and management actions within OMB-defined "metropolitan areas". Because the U.S. Census Bureau does not identify urban areas or urban clusters at the county level, OMB-defined "metropolitan areas" must be used as an urban approximation. See http://www.census.gov/population/www/metroareas/metrodef.html for a complete list of areas and their county components in the US. Census designations of "urban"/"rural" are determined using criteria distinct from OMB designations of "metro"/"non-metro". Thus OMB metropolitan areas will often have both "urban" and "rural" counties within their delineation. If business transactions are expected in one of these counties, use the following guidelines.

Rural counties within metropolitan areas – In these settings, forest -related business transactions often occur in rural counties that are dominated by commuting patterns linked to urban counties. They are typically classified as "outlying" counties within the metropolitan area. The 60 percent threshold for a labor market cannot be met without including substantial urban – or "central" -- counties. Local government and community leaders in these areas often see forest-related economic effects as important contributors to their county. Consequently, leaders raise labor and income issues in their attempts to encourage local businesses and generate local tax revenues. Under these circumstances, the analysis area should be limited to the rural county or counties of concern. They represent a portion of the larger labor market defined by the metropolitan area. To maintain the integrity of OMB-defined labor market areas, do not mix these counties in the same analysis area with counties outside the metropolitan area.

Urban counties within metropolitan areas – In these settings, forest -related business transactions typically occur in very urban counties that are dominated by commuting patterns to and from other parts of the large urban area. These counties are typically classified as "central" to the metropolitan area. The 60 percent threshold for a labor market typically cannot be met without including other "central" counties. Typically, forest-related business transactions are so small compared with the metro area economy, that labor and income issues are not relevant. However, if the national forest project or plan offers substantial changes to the lifestyle or business environment in a particular county, local government and community leaders may see forest-related economic effects as important. In these circumstances, the analysis area should be limited to the county or counties of concern. They represent a portion of the larger labor market defined by the metropolitan area. Do not mix metropolitan area counties in the same analysis area with counties outside the metropolitan area.

Other special circumstances

Occasionally, the 60% threshold cannot be obtained without violating the non-metro criterion. This is often true for resort areas where local housing costs exceed the financial means of many workers. In these situations, commuting distances may be significant, drawing workers from urban counties. A metro county should only be included when at least 25% of that county's resident workers commute to the proposed analysis area. See White River NF East example.

Occasionally, one county will participate in two distinct labor markets. Topography and transportation routes will isolate each part of the county resulting in two distinct commuting patterns. Because counties are used as building blocks for analysis area delineation, they cannot be split. Include a county if at least 25% of the resident workers in a given county are employed in the proposed analysis area. See White River NF West example.

When delineating two or more analysis areas that adjoin, repeat the procedures shown above for "General circumstances" to decide which counties should be included in each area. See White River NF East & West examples.

Occasionally, a count will fall just short of the 25% criterion for inclusion. See Garfield County in the White River NF West example. Similarly, an entire analysis area may fall short of the 60% threshold. In these circumstances, consultation with state and/or local labor market officials is advised. State labor market officials are typically located in the state department, agency, and staff that has responsibilities for collecting covered employment and wages data. Following consultation, the analyst may determine that the area best suited for labor market analysis will not meet the criteria provided above. See the McCall RD example.

Using a labor market IMPLAN model

IMPLAN models based on labor market areas may not be well suited for analyzing the consequences of trade flows. Although labor markets are generally used to identify functional economic areas, professional expertise should be sought before using a labor-flow based IMPLAN model for addressing trade flows. A regional economist should be consulted.

Labor market protocol examples

1. Rochester RD, Green Mountain NF

   The Sugarbush Ski Area has proposed modifications that are expected to increase skier visits. Additional workers will be needed to support the increase in skier volume. What analysis area should the analyst use to evaluate the economic impacts of the proposed action?

   The proposed action is located in Washington County, VT. Washington County also has communities that are likely to capture associated worker spending. A “Labor Shed Analysis” report is prepared and shown in Figure A. Workers living in Washington County constitute 58% of the work force. This falls short of the 60% threshold given in the criteria. Should Chittenden County be included in the analysis area? A “Commute Shed Analysis” report is prepared and shown as the second table in Figure A. Only 4% of the Chittenden County work force is employed in Washington County, and thus Chittenden County should not be included. Next on the Washington County report is Orange County. A “Commute Shed Analysis” report is prepared for Orange County and shown as the third table in Figure A. Over 32% of the Orange County work force is employed in Washington County, thus meeting the 25% criterion for inclusion in the labor market area. The final analysis area should include both Washington and Orange Counties. These two counties account for over 67% of all workers employed in Washington County.

Figure A. Labor Market Reports for the Rochester RD, Green Mountain NF (2006)

Washington County, VT		
	Count	**Share**
Jobs Total	34,165	100.0%
Job counts in Counties Where Workers Live		
	Count	**Share**
Washington Co., Vermont	19,822	58.0%
Chittenden Co., Vermont	3,683	10.8%
Orange Co., Vermont	3,271	9.6%
Caledonia Co., Vermont	1,201	3.5%
Lamoille Co., Vermont	1,007	2.9%
Rutland Co., Vermont	939	2.7%
Windsor Co., Vermont	703	2.1%
Franklin Co., Vermont	672	2.0%
All Other Locations	2,867	8.4%

Chittenden County, VT		
	Count	**Share**
Jobs Total	83,947	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Chittenden Co., Vermont	70,612	84.1%
Washington Co., Vermont	3,683	4.4%
Franklin Co., Vermont	1,731	2.1%
Windsor Co., Vermont	1,694	2.0%
Addison Co., Vermont	1,547	1.8%
Rutland Co., Vermont	1,397	1.7%
Lamoille Co., Vermont	1,038	1.2%
All Other Locations	2,245	2.6%

Orange County, VT		
	Count	**Share**
Jobs Total	10,184	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Orange Co., Vermont	4,484	44.0%
Washington Co., Vermont	3,271	32.1%
Windsor Co., Vermont	1,867	18.3%
Rutland Co., Vermont	244	2.4%
Windham Co., Vermont	103	1.0%
All Other Locations	215	2.0%

Sources: US Census Bureau, LED Origin-Destination Data Base (2nd Quarter 2002, 2003 and 2004)

2. Jackson RD, Bridger-Teton NF

   An endangered bird species nests in habitat found along the Gross Ventre River. The District proposes to expand the nesting habitat, potentially increasing bird numbers. It is expected that birders will now flock to Jackson and nearby towns to observe the nesting behavior. An economic impact analysis is needed in response to tourism issues raised during NEPA scoping. What counties should be included in the analysis area?

   The proposed action is located in Teton County, WY. A "Labor Shed Analysis" report is prepared and shown in Figure B. Workers living in Teton County, WY fall short of the 60% threshold given in the criteria. Teton County, ID looks like a good candidate for inclusion, but does not meet the 25% criterion based on the Teton County, WY report. A "Commute Shed Analysis" report for the Idaho county is prepared and also shown in Figure B. Over half of Teton County, ID workers are employed in Teton County, WY, easily meeting the 25% criterion for inclusion in the labor market area. The final analysis area should include Teton County from both Wyoming and Idaho, and exceeds the 60% threshold.

Figure B. Labor Market Reports for the Jackson RD, Bridger-Teton NF (2006)

Teton County, WY		
	Count	**Share**
Jobs Total	15,867	100.0%
<u>Job counts in Counties Where Workers Live</u>		
	Count	**Share**
Teton Co., Wyoming	8,885	56.0%
Teton Co., Idaho	2,251	14.2%
Natrona Co., Wyoming	860	5.4%
Lincoln Co., Wyoming	635	4.0%
Bonneville Co., Idaho	467	2.9%
Bannock Co., Idaho	308	1.9%
Weston Co., Wyoming	301	1.9%
Park Co., Wyoming	241	1.5%
Park Co., Montana	213	1.3%
Madison Co., Idaho	192	1.2%
All Other Locations	1,514	9.5%

Teton County, ID		
	Count	**Share**
Jobs Total	4,458	100.0%
<u>Job counts in Counties Where Workers are Employed</u>		
	2006	
	Count	**Share**
Teton Co., Wyoming	2,251	50.5%
Teton Co., Idaho	1,841	41.3%
Bonneville Co., Idaho	86	1.9%
Madison Co., Idaho	70	1.6%
Twin Falls Co., Idaho	36	0.8%
Fremont Co., Idaho	29	0.7%
Blaine Co., Idaho	28	0.6%
Bannock Co., Idaho	24	0.5%
Jefferson Co., Idaho	16	0.4%
Lincoln Co., Wyoming	15	0.3%
All Other Locations	62	1.4%

Sources: US Census Bureau, LED Origin-Destination Data Base (2nd Quarter 2002, 2003 and 2004)

3. McCall RD, Payette NF

A pest infestation on the McCall District has run its course. To remove hazard trees, capture the value of dead timber, and restore watershed conditions, a substantial amount of timber removal and reforestation work must be done. During scoping, some businesses expressed concern that the size of this project will adversely affect their businesses during two summers of project activity. An economic impact analysis is conducted to assess likely effects on local jobs and income. What counties should be included in the analysis area?

The proposed action is located in Valley County, ID. Processing of the timber is expected to occur in Valley County as well. A “Labor Shed Analysis” report is prepared and shown in Figure C. Workers living in Valley County alone do not meet the 60% threshold given in the criteria. Ada County looks like a potential candidate for inclusion, but does not meet the 25% criterion based on the Valley County report. A “Commute Shed Analysis” report for Ada County is prepared and shown in Figure C. A very small share of Ada County workers is employed in Valley County – so small that it is included in “All other locations”. In addition, Ada County is dominated by Boise and therefore is considered urban. (This information is obtained from other sources, such as first-hand knowledge of the area or reviewing information at http://www.census.gov/population/www/metroareas/metrodef.html) Even if Ada County met the 25% criterion, it should not be included. Adams County is the next candidate. A “Commute Shed Analysis” report for Adams County is prepared and shown in Figure C. Adams County just meets the 25% criterion (25.2%), and should be included in the area. With the inclusion of Adams County, the analysis area only accounts for 53.6% of employment – still short of the 60% threshold. Canyon County is next on the list for consideration. A “Commute Shed Analysis” report for Canyon County is prepared and shown in Figure C. Like Ada County, a very small share of Canyon County workers is employed in Valley County – so small that it is included in “All other locations”. And like Ada County, Canyon County is dominated by Nampa and the Boise metropolitan area. Even if Canyon County met the 25% criterion, it should not be included. Although not shown in the abbreviated report below for Valley County, all remaining counties either provide a very small share of workers to the area or are located in counties that are quite distant and not contiguous to the area. Even though the Valley-Adams County area falls short of the 60% threshold, the analyst believes it is the best analysis area for the project. This is confirmed by discussions with the state labor market agency.

Figure C. Labor Market Reports for the McCall RD, Payette NF (2006)

Valley County ID		
	Count	**Share**
Jobs Total	4,040	100.0%
Job counts in Counties Where Workers Live		
	Count	**Share**
Valley Co., Idaho	1,852	45.8%
Ada Co., Idaho	712	17.6%
Adams Co., Idaho	314	7.8%
Canyon Co., Idaho	294	7.3%
All Other Locations	868	21.5%

Ada County ID		
	Count	**Share**
Jobs Total	197,079	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Ada Co., Idaho	170,755	86.6%
Canyon Co., Idaho	14,498	7.4%
All Other Locations	11,826	6.0%

Adams County ID		
	Count	**Share**
Jobs Total	1,248	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Adams Co., Idaho	560	44.9%
Valley Co., Idaho	314	25.2%
Ada Co., Idaho	95	7.6%
All Other Locations	279	22.4%

Canyon County, ID		
	Count	**Share**
Jobs Total	60,212	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Canyon Co., Idaho	33,411	55.5%
Ada Co., Idaho	22,715	37.7%
Payette Co., Idaho	897	1.5%
All Other Locations	3,189	5.3%

Sources: US Census Bureau, LED Origin-Destination Data Base (2nd Quarter 2002, 2003 and 2004)

White River NF East

Vail Associates, Inc has submitted ski area modification plans to the White River NF for both Vail and Breckenridge ski areas. A small amount of additional employment will be required for each area once the modifications are in place and operational. Opponents of the plans argue that additional employees will make current labor force issues worse, increasing the demand for limited housing, and adding to greenhouse gases as more workers commute to both areas. As part of the NEPA documentation, an economic impact analysis is needed. What counties should be included in the analysis area?

The analyst is unsure whether to analyze impacts for Summit County (home of Breckenridge) and Eagle County (home of Vail) separately or combined. A “Labor Shed Analysis” report is prepared for Summit County first, and shown in Figure D. Workers living in Summit County alone are substantially short of the 60% threshold given in the criteria. Jefferson County looks like a potential candidate for inclusion, but does not meet the 25% criterion based on the Summit County report. The analyst already knows that Jefferson County is part of the Denver metro area, and therefore excludes the county. Lake County is next on the report. A “Commute Shed Analysis” report for Lake County is prepared and shown in Figure D. Lake County just misses the 25% criterion, but is so close that the analyst reserves judgment. Denver County is next, but the analyst already knows that Denver is very urban and should not be included in the analysis area. Eagle County is considered next. Since Eagle County has become a candidate for inclusion with Summit County, the analyst now realizes that a combined analysis area of at least Summit and Eagle must be used. By reviewing the “Commute Shed Analysis” report for Lake County, it becomes clear that Lake County should be included in the analysis area.

At this point, the analyst decides to reconfigure the “Labor Shed Analysis” report and run it for a combined Eagle-Lake-Summit area. The result is shown in Figure D. Residents in this 3-county area account for nearly 52% of total employment. A quick scan of the report reveals that all subsequent counties are part of the Denver-Aurora metro area, and therefore should not be included, except Garfield. A “Commute Shed Analysis” report is prepared for Garfield County, and reveals that it does not meet the 25% criterion for inclusion (report is shown in Figure E). After some consultation with local and state officials, the analyst settles on the Eagle-Lake-Summit analysis area.

Figure D. Labor Market Reports for the White River NF East (2006)

Summit County, CO		
	Count	**Share**
Jobs Total	18,756	100.0%
Job counts in Counties Where Workers Live		
	Count	**Share**
Summit Co., Colorado	5,700	30.4%
Jefferson Co., Colorado	1,932	10.3%
Lake Co., Colorado	1,289	6.9%
Denver Co., Colorado	1,208	6.4%
Eagle Co., Colorado	1,135	6.1%
Arapahoe Co., Colorado	1,077	5.7%
Boulder Co., Colorado	808	4.3%
El Paso Co., Colorado	749	4.0%
Douglas Co., Colorado	736	3.9%
All Other Locations	4,122	21.9%

Lake County, CO		
	Count	**Share**
Jobs Total	5,332	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Eagle Co., Colorado	1,512	28.4%
Lake Co., Colorado	1,440	27.0%
Summit Co., Colorado	1,289	24.2%
All Other Locations	1,.91	20.5%

Eagle-Lake-Summit Counties, CO		
	Count	**Share**
Jobs Total	49,297	100.0%
Job counts in Counties Where Workers Live		
	Count	**Share**
Eagle Co., Colorado	14,928	30.3%
Summit Co., Colorado	6,341	12.9%
Lake Co., Colorado	4,241	8.6%
Garfield Co., Colorado	3,521	7.1%
Jefferson Co., Colorado	3,124	6.3%
Denver Co., Colorado	2,663	5.4%
Arapahoe Co., Colorado	1,997	4.1%
All Other Locations	12,482	25.4%

Sources: US Census Bureau, LED Origin-Destination Data Base (2nd Quarter 2002, 2003 and 2004)

4. White River NF West

   The Aspen District is experiencing increased recreation pressure during the summer season. In response, the Forest has decided to propose substantial facility expansions and improvements. At the same time, the Colorado Department of Transportation (CDOT) has announced plans to improve Highway 82, the only major route into Aspen. Some organizations are concerned that all the improvements will persuade even more visitors to the county, making daily commutes by workers into Aspen even worse, while others are concerned that the construction will provide an impediment to critical summer tourist seasons. Both are concerned with the economic consequences of tourism. As part of a cumulative effects analysis, an evaluation of economic impacts will be included in the Forest's NEPA document. What analysis area should be used?

   Pitkin County is the location of both Forest and CDOT proposed actions. A "Labor Shed Analysis" report is prepared for Pitkin County first, and shown in Figure E. Workers living in Pitkin County alone fall short of the 60% threshold given in the criteria. Garfield County just misses the 25% criterion, but is so close that the analyst reserves judgment. A "Commute Shed Analysis" report for Garfield County is prepared and shown in Figure E. Only 15% of the Garfield work force is employed in Pitkin County. Eagle County is the next county listed in the Pitkin County report. A "Commute Shed Analysis" report for Eagle County is prepared and shown in Figure E. Only 14% of the Eagle work force is employed in Pitkin County. The analyst realizes that the southwestern tip of Eagle County includes the towns of El Jebel and Balsalt, two communities that are geographically separated from the population center of Eagle County. Based on this information, the analyst excludes Eagle County, and decides to include Garfield County. Consultation with local and state officials confirms that the final analysis area should include both Pitkin and Garfield Counties.

Figure E. Labor Market Reports for the White River NF West (2006)

Pitkin County, CO		
	Count	**Share**
Jobs Total	17,491	100.0%
Job counts in Counties Where Workers Live		
	Count	**Share**
Pitkin Co., Colorado	7,344	42.0%
Garfield Co., Colorado	4,356	24.9%
Eagle Co., Colorado	2,935	16.8%
All Other Locations	2,856	16.3%

Garfield County, CO		
	Count	**Share**
Jobs Total	28,627	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Garfield Co., Colorado	16,984	59.3%
Pitkin Co., Colorado	4,356	15.2%
Eagle Co., Colorado	2,793	9.8%
Mesa Co., Colorado	914	3.2%
Summit Co., Colorado	563	2.0%
All Other Locations	3,017	10.5%

Eagle County, CO		
	Count	**Share**
Jobs Total	21,002	100.0%
Job counts in Counties Where Workers are Employed		
	Count	**Share**
Eagle Co., Colorado	13,748	65.5%
Pitkin Co., Colorado	2,935	14.0%
Summit Co., Colorado	1,135	5.4%
Garfield Co., Colorado	636	3.0%
Denver Co., Colorado	489	2.3%
All Other Locations	2,059	9.8%

Sources: US Census Bureau, LED Origin-Destination Data Base (2nd Quarter 2002, 2003 and 2004)

Step 3 – Trade Flow Protocol

The purpose of this protocol is to delineate analysis areas that respond primarily to one or more input commodities of interest. Input commodities are also known as goods and services needed for a production process.

Start with a proposed analysis area of one or more counties where project- or program-related production inputs are needed (destination counties). NFS land ownership is not a reliable guide for identifying these counties.

Trade flow areas should encompass the most important inputs required by the subject industry. Commodity issues may specify the inputs of greatest interest. If issues do not specify a particular commodity, use the top ten commodity inputs identified in Tables 3 and 4. These commodities are ranked based on their share of each dollar (coefficient) spent in the production process. Table 5 offers supplemental information on the role of commodities, total value added, and labor in total production for selected resource-related industries. Tables 3, 4, and 5 are derived from a 2006 IMPLAN model for the U.S.

Some inputs may suggest one trade area, while other inputs may suggest a different one -- or none at all. If more than one input is specified in public comments or if several inputs shares are of similar magnitude in the tables, multiple commodities may be used to identify a comprehensive or mixed trade flow area. Because commodities may have very different market areas that could render a comprehensive or mixed trade flow area as ineffective or misleading, seek professional expertise before proceeding. A regional economist should be consulted.

Table 3. Top Ten Commodity Inputs to National Production Functions for Selected Ag, Mining, and Wood Processing Industries (2006)

Industry Name/Code	**Cattle ranching and farming (11)**		**Animal Production other than Cattle & Poultry (13)**		**Logging (14)**		**Oil & Gas Extraction (19)**		**Coal mining (20)**	
Commodity Ranking	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient
1	11	0.195974842	47	0.208453283	15	0.293937773	19	0.15970552	20	0.116060875
2	10	0.155139178	10	0.131340653	14	0.19135651	436	0.068499416	142	0.047858436
3	431	0.08568757	431	0.074158713	18	0.087154984	28	0.022700036	259	0.043787539
4	142	0.084907286	142	0.072453782	142	0.042213425	451	0.015192589	472	0.034671966
5	47	0.061714891	13	0.050894473	390	0.026576746	147	0.013538584	24	0.031344913
6	18	0.043969423	2	0.044589989	161	0.012934708	142	0.010976846	392	0.025468176
7	390	0.038435932	390	0.043444686	430	0.009011874	30	0.005901875	29	0.01814948
8	2	0.026672665	18	0.026165444	451	0.007154913	450	0.005857717	390	0.017589258
9	449	0.024426792	257	0.022727264	31	0.006501289	446	0.005783603	451	0.016725603
10	159	0.016906835	394	0.021767719	431	0.006186731	203	0.005782138	292	0.014359265

Industry Name/Code	**Iron ore mining (21)**		**Copper- nickel- lead- and zinc mining (22)**		**Gold- silver- and other metal ore mining (23)**		**Stone mining and quarrying (24)**		**Sand- gravel- clay- and refractory mining (25)**	
Commodity Ranking	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient
1	30	0.074205488	142	0.083874352	142	0.093379214	142	0.09545017	142	0.102174692
2	19	0.068943486	259	0.059538238	23	0.091347054	259	0.038686544	25	0.026442133
3	259	0.067002572	22	0.045874134	259	0.059005778	24	0.032599337	259	0.024488239
4	142	0.059143167	23	0.043725155	451	0.02694167	451	0.029019931	30	0.021634636
5	21	0.029854717	30	0.041576955	30	0.022765167	292	0.025690816	19	0.020864699
6	451	0.029787498	451	0.026552981	292	0.020030417	30	0.017765841	451	0.020510625
7	292	0.022618296	292	0.024891675	390	0.019132048	390	0.016584128	29	0.015446299
8	203	0.019294519	390	0.02128868	394	0.013554952	394	0.013296473	390	0.010848977
9	390	0.01823711	439	0.018308148	29	0.009863823	168	0.010409326	292	0.009157062
10	500	0.017474854	394	0.014703697	168	0.009188956	473	0.010387999	426	0.008354595

Source: Minnesota IMPLAN Group, Inc, 2006 US Model.

Table 3 (con't'd). Top Ten Commodity Inputs to National Production Functions for Selected Ag, Mining, and Wood Processing Industries (2006)

Industry Name/Code	**Other nonmetallic mineral mining (26)**		**Drilling oil and gas wells (27)**		**Support activities for oil and gas operations (28)**		**Support activities for other mining (29)**		**Sawmills (112)**	
Commodity Ranking	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient
1	142	0.068113253	142	0.123225816	451	0.013967342	439	0.073085897	14	0.306557864
2	259	0.041652046	451	0.112181678	142	0.006858374	142	0.054199506	15	0.117479816
3	19	0.04059637	473	0.034713071	28	0.002156584	452	0.043945394	112	0.093290657
4	394	0.039762583	390	0.029903201	439	0.001575304	29	0.041558374	390	0.040164609
5	30	0.030311003	437	0.029738348	203	0.001494683	454	0.02924945	394	0.025030578
6	26	0.029439569	259	0.024355175	390	0.001405225	458	0.026133306	450	0.011562134
7	451	0.025004629	203	0.022588989	446	0.001383198	259	0.023886109	30	0.009251971
8	292	0.017873608	426	0.013054182	233	0.001351095	203	0.022770967	392	0.007127716
9	29	0.013321884	171	0.012525739	436	0.001321923	451	0.017413625	430	0.006568799
10	20	0.013081166	288	0.010989108	431	0.001161659	390	0.015018373	311	0.006073307

Industry Name/Code	**Wood preservation (113)**		**Reconstituted wood product manufacturing (114)**		**Veneer and plywood manufacturing (115)**		**Engineered wood member and truss manufacturing (116)**		**Wood windows and door manufacturing (117)**	
Commodity Ranking	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient
1	112	0.404199809	152	0.093382932	14	0.294068456	112	0.229284808	112	0.085270785
2	390	0.112369277	14	0.059953008	115	0.11247278	390	0.067746483	390	0.073250011
3	14	0.067754783	114	0.056311443	390	0.0550991	123	0.041860133	123	0.045987897
4	394	0.043600619	142	0.040455274	15	0.049989931	394	0.026644766	118	0.038824242
5	150	0.017879175	112	0.036760323	394	0.028304085	233	0.026322518	394	0.035545766
6	151	0.012770616	390	0.020674458	162	0.02774661	114	0.023177527	241	0.031611584
7	450	0.012072933	394	0.020434707	114	0.01663034	450	0.011589115	114	0.028967176
8	392	0.008360144	30	0.020248352	450	0.012282568	451	0.010779019	115	0.02580443
9	171	0.007746674	31	0.009548376	30	0.012178154	431	0.006098675	190	0.020714978
10	430	0.006114104	161	0.008267386	451	0.010291548	430	0.006046625	450	0.013049723

Source: Minnesota IMPLAN Group, Inc, 2006 US Model.

Table 3 (con't'd). Top Ten Commodity Inputs to National Production Functions for Selected Ag, Mining, and Wood Processing Industries (2006)

Industry Name/Code	**Cut stock- resawing lumber- and planing (118)**		**Other millwork- including flooring (119)**		**Wood container and pallet manufacturing (120)**		**Prefabricated wood building manufacturing (123)**		**Miscellaneous wood product manufacturing (123)**	
Commodity Ranking	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient
1	112	0.380569309	112	0.310230345	112	0.328155577	112	0.139678806	112	0.130373403
2	390	0.090507634	390	0.095276915	390	0.07537163	390	0.073988236	390	0.085308112
3	394	0.039293095	123	0.041900594	14	0.034961149	123	0.049493555	123	0.060039334
4	14	0.037970942	394	0.037558917	394	0.033059694	117	0.036704712	394	0.020267356
5	450	0.012756181	241	0.025534134	451	0.017251905	362	0.033883274	14	0.018631982
6	451	0.010177784	190	0.021841045	450	0.012988987	394	0.025763031	115	0.017161926
7	123	0.008458802	14	0.020437816	123	0.009924368	236	0.024549659	451	0.016045587
8	30	0.008179497	450	0.014135142	431	0.009360191	114	0.024233537	126	0.01497445
9	392	0.007233093	451	0.013898336	30	0.007765267	115	0.016130358	450	0.012092109
10	311	0.006768571	118	0.008653905	430	0.006913678	341	0.015872665	114	0.011781642

Industry Name/Code	**Pulp mills (124)**		**Paper and paperboard mills (125)**		**Paperboard container manufacturing (126)**	
Commodity Ranking	Commodity Code	Coefficient	Commodity Code	Coefficient	Commodity Code	Coefficient
1	14	0.181598827	124	0.078508206	125	0.430198669
2	112	0.079243243	14	0.070261821	451	0.041955803
3	390	0.051786084	390	0.064359799	390	0.039733823
4	142	0.044117324	112	0.041613065	394	0.020973688
5	150	0.038379002	142	0.036471397	142	0.020080229
6	31	0.032338168	151	0.031305641	167	0.014506872
7	151	0.029996583	31	0.030194601	450	0.013276131
8	394	0.028467765	394	0.030045735	162	0.008137951
9	451	0.025282228	30	0.02368463	430	0.007608402
10	30	0.020657826	451	0.023205774	431	0.007461770

Source: Minnesota IMPLAN Group, Inc, 2006 US Model.

Table 4. Commodity Codes, Names, and Top Ten Occurrences in National Production Functions for Selected Agricultural, Mining, and Wood Processing Industries (2006)

Code	Name	Number of Occurrences in Top Ten
2	Grain farming	2
10	All other crop farming	2
11	Cattle ranching and farming	1
13	Animal production- except cattle and poultry	1
14	Logging	11
15	Forest nurseries- forest products- and timber	3
18	Agriculture and forestry support activities	3
19	Oil and gas extraction	4
20	Coal mining	2
21	Iron ore mining	1
22	Copper- nickel- lead- and zinc mining	1
23	Gold- silver- and other metal ore mining	2
24	Stone mining and quarrying	2
25	Sand- gravel- clay- and refractory mining	1
26	Other nonmetallic mineral mining	1
28	Support activities for oil and gas operations	2
29	Support activities for other mining	5
30	Power generation and supply	14
31	Natural gas distribution	4
47	Other animal food manufacturing	2
112	Sawmills	12
114	Reconstituted wood product manufacturing	6
115	Veneer and plywood manufacturing	4
117	Wood windows & door manufacturing	1
118	Cut stock- resawing lumber- and planing	2
123	Miscellaneous wood product manufacturing	7
124	Pulp mills	1
125	Paper and paperboard mills	1
126	Paperboard container manufacturing	1
142	Petroleum refineries	18
147	Petrochemical manufacturing	1
150	Other basic inorganic chemical manufacturing	2
151	Other basic organic chemical manufacturing	3
152	Plastics material and resin manufacturing	1
159	Pesticide and other agricultural chemical man	1
161	Paint and coating manufacturing	2
162	Adhesive manufacturing	2

Source: Minnesota IMPLAN Group, Inc, 2006 US Model.

Table 4 (cont'd). Commodity Codes, Names, and Top Ten Occurrences in National Production Functions for Selected Ag, Mining, and Wood Processing Industries (2006)

Code	Name	Number of Occurrences in Top Ten
167	Printing ink manufacturing	1
168	Explosives manufacturing	2
171	Other miscellaneous chemical product manufacturing	2
190	Glass and glass products- except glass containers	2
203	Iron and steel mills	5
233	Fabricated structural metal manufacturing	2
236	Sheet metal work manufacturing	1
241	Hardware manufacturing	2
257	Farm machinery and equipment manufacturing	1
259	Construction machinery manufacturing	9
288	Pump and pumping equipment manufacturing	1
292	Conveyor and conveying equipment manufacturing	7
311	Semiconductors and related device manufacturing	2
341	Wiring device manufacturing	1
362	Wood kitchen cabinet & countertop manufacturing	1
390	Wholesale trade	26
392	Rail transportation	4
394	Truck transportation	19
426	Securities- commodity contracts- investments	2
430	Monetary authorities and depository credit in	6
431	Real estate	7
436	Lessors of nonfinancial intangible assets	2
437	Legal services	1
439	Architectural and engineering services	3
446	Scientific research and development services	2
449	Veterinary services	1
450	All other miscellaneous professional and tech	11
451	Management of companies and enterprises	21
452	Office administrative services	1
454	Employment services	1
458	Services to buildings and dwellings	1
472	Spectator sports	1
473	Independent artists- writers- and performers	2
500	Noncomparable imports	1

Source: Minnesota IMPLAN Group, Inc, 2006 US Model.

Table 5. National Coefficients and Selected Labor Relationships for Resource-Related Industries (2006)

Industry Group	Industry Code	Industry Name	Inputs per Dollar of Production			Labor Income per Job	Jobs per $Million Output
			Commodities	Value Added	Labor Income		
Agriculture							
	11	Cattle ranching and farming	0.900	0.100	0.061	6,368	9.6
	13	Animal production- except cattle and poultry	0.886	0.114	0.100	3,979	25.2
	14	Logging	0.736	0.264	0.164	40,170	4.1
Mining							
	19	Oil and gas extraction	0.380	0.620	0.248	180,698	1.4
	20	Coal mining	0.522	0.478	0.259	95,681	2.7
	21	Iron ore mining	0.594	0.406	0.282	103,165	2.7
	22	Copper- nickel- lead- and zinc mining	0.553	0.447	0.340	95,271	3.6
	23	Gold- silver- and other metal ore mining	0.499	0.501	0.236	107,233	2.2
	24	Stone mining and quarrying	0.427	0.573	0.335	68,978	4.9
	25	Sand- gravel- clay- and refractory mining	0.383	0.617	0.390	70,398	5.5
	26	Other nonmetallic mineral mining	0.488	0.512	0.337	79,929	4.2
	27	Drilling oil and gas wells	0.646	0.354	0.123	82,568	1.5
	28	Support activities for oil and gas operations	0.052	0.948	0.344	78,069	4.4
	29	Support activities for other mining	0.486	0.514	0.314	63,243	5.0
Wood Processing							
	112	Sawmills	0.709	0.291	0.160	42,665	3.8
	113	Wood preservation	0.781	0.219	0.160	45,134	3.5
	114	Reconstituted wood product manufacturing	0.469	0.531	0.146	55,712	2.6
	115	Veneer and plywood manufacturing	0.723	0.277	0.237	43,931	5.4
	116	Engineered wood member and truss mfg	0.551	0.449	0.237	40,599	5.8
	117	Wood windows and door manufacturing	0.575	0.425	0.245	44,024	5.6
	118	Cut stock- resawing lumber- and planing	0.704	0.296	0.245	34,803	7.1
	119	Other millwork- including flooring	0.727	0.273	0.245	40,497	6.1
	120	Wood container and pallet manufacturing	0.636	0.364	0.287	32,411	8.9
	123	Miscellaneous wood product manufacturing	0.535	0.465	0.246	36,150	6.8
	124	Pulp mills	0.742	0.258	0.174	120,917	1.4
	125	Paper and paperboard mills	0.674	0.326	0.164	100,985	1.6
Tourism & Recreation							
	397	Scenic and sightseeing transportation	0.206	0.794	0.703	72,993	9.6
	405	Food and beverage stores	0.372	0.628	0.439	26,344	16.7
	406	Health and personal care stores	0.354	0.646	0.470	32,695	14.4
	407	Gasoline stations	0.316	0.684	0.310	26,073	11.9
	408	Clothing and clothing accessories stores	0.342	0.658	0.324	22,022	14.7
	409	Sporting goods- hobby- book and music stores	0.381	0.619	0.417	18,849	22.1
	410	General merchandise stores	0.398	0.602	0.427	24,232	17.6
	411	Miscellaneous store retailers	0.249	0.751	0.541	19,280	28.0
	471	Performing arts companies	0.498	0.502	0.534	14,331	37.2
	473	Independent artists- writers- and performers	0.519	0.481	0.415	40,995	10.1
	475	Museums- historical sites- zoos- and parks	0.451	0.549	0.635	47,548	13.3
	476	Fitness and recreational sports centers	0.423	0.577	0.520	17,385	29.9
	478	Other amusement, gambling and recreation	0.404	0.596	0.335	25,330	13.2
	479	Hotels and motels- including casino hotels	0.355	0.645	0.365	31,893	11.4
	480	Other accommodations	0.573	0.427	0.234	23,113	10.1
	481	Food services and drinking places	0.519	0.481	0.339	17,320	19.6

Source: Minnesota IMPLAN Group, Inc, 2006 US Model.

Follow the procedure outlined in Tables 6 and 7 to generate a trade flow report for the input commodities of interest.

Table 6. Procedures to Generate a Trade Flow Report Directly from Local Data Sources.

Step	Actions
1	Inquire from an industry representative or other knowledgeable source the states/counties where inputs of interest are obtained for their production processes. Firm names need not be revealed. Origin states should only include those adjacent to your state of interest.
2	Map the counties
3	Evaluate results using the criteria listed below.

Table 7. Procedures to Generate a Trade Flow Report from IMPLAN Trade Flow Data.

Step	Actions
1	Obtain a trade flow database file (.mdb) for the state of interest and TradeFlow_Report_Builder.mdb from the WO-PAG website. The files may be placed anywhere on your computer hard drive, but placing both in the same folder will expedite the process. The report builder works for 2006 data only.
2	Open TradeFlow_Report_Builder.mdb. Follow Steps 1 through 5 to create and export a report.
3	Step 1 – Click on the button “Select State Tradeflow Database”. Once the window opens, locate the state trade flow database of interest, highlight it, then click on “Open”. The state database has now been linked to the report builder.
4	Step 2 – In the first column, select the same state as the database that was linked in Step 1. In all other columns, select one or more items as needed. Hold the “Control” button to select multiple counties, state, or commodities.
5	Steps 3 & 4 – Click on the button “Create Reports”. A window appears allowing the user to append the results of this report to any previous reports that have been created. This feature is helpful when multiple counties or commodities are selected in separate reports, but the user wishes to see all results in a single report. Once the reports have been created, click on the button “Open Detailed Report” or the button “Open Summary Report” to view results. The summary report combines multiple commodity values by origin county.
6	Step 5 – To save the reports, click on the button “Export Reports to Excel”. The reports are exported in a single file to the same folder that holds the Report Builder. Change the name of the exported file to avoid replacement by future exported files from Report Builder.
7	If desired, report can be imported into mapping software, e.g. ArcView. See mapping software for details.
8	Evaluate results using the criteria listed below.

Examine the originating states and counties in the trade flow report. Use the following criteria to guide identification of the best area for conducting economic impact analyses.

General circumstances

1. Limit trade flow areas to originating counties where dollar volume of the input commodity is significant. In most cases, a minimum of at least $10,000 ($0.01 in millions) should be required. In rare cases, $10,000 may be too insignificant and, therefore, the minimum should be raised. See the Nez Perce County example for Sawmill products (commodity 112) and the Montrose County example for Logs & Stumpage (commodities 14 & 15).
2. The trade flow issue is typically raised by parties with a particular geographical interest. Therefore, limit the trade flow area to counties within this geography. For broader acceptance and understanding, a trade flow area within this geography should be contiguous. The contiguous area must include originating counties and destination counties, plus a minimum of unaffected counties. In situations where any part of a state is regarded as economically or politically relevant to the issue, the trade flow area may include counties geographically separated from the destination counties. The separate areas may be in the same state as or in different states from the destination counties. Where originating counties are widely scattered within a state or across several states, a trade flow area may be too diluted to offer useful impact information for that commodity. See the Shoshone County example for Conveyor & Construction Equipment (commodities 259 & 292) and the Moffat County example for Hay (commodity 10).
3. Do not include metropolitan area counties when the issue is focused on linkages between non-metro counties. Metro counties should be excluded from the trade flow area if substantial inputs are obtained from non-metro counties of interest. Including metro counties generally mask economic impact consequences in smaller rural counties.

Using a trade flow IMPLAN model

IMPLAN models based on trade flow areas for particular input commodities should only be used for analyzing the consequences of those particular input commodities. There is no assurance that such models would be suitable for addressing other economic impact issues, unless the model area was purposefully designed to address those issues. For example, models designed to address commodity trade flow issues may not provide appropriate induced effects expected from local labor and income flows. In a second example, models designed to address indirect effects related to one input commodity may not provide appropriate indirect effects related to a second commodity that was not considered in the initial analysis area. If a second input commodity is being examined, then a different analysis area designed for that input should be delineated. Models based on market areas for more than one commodity should be reviewed by a regional economist for their applicability.

Trade flow protocol examples

1. Nez Perce County, ID

   Lewiston, ID is a center for pulp production in the Northwest. There is local concern that one pulpmill is on the verge of closing. It is known that the mill makes significant purchases of fiber from area sawmills. The Forest Service is considering management changes that will reduce timber supplies tyically purchased by the pulpmill. This action may further threaten the viability of the mill. During scoping, an issue is raised regarding the impact on area sawmills – even those that rely heavily on private timber – if the pulpmill closes in response to the reduced fiber from NFS lands. What counties should be included in the analysis?

   Based on Table 3, the public is rightly concerned about the linkages between sawmills and pulp mills. Sawmill output is the second largest commodity input into the pulp mill production process. The analyst seeks information on local sawmill input sources, but pulp mill and industry officials decline to comment. By following the protocol using IMPLAN trade flow data, the likely origins of Commodity 112 whose destination is Nez Perce County, Idaho can be identified. Results from the trade flow report builder may be entered into mapping software. The example is shown in Table 8 and Figure F. Based on this information, it would be reasonable to limit the analysis area to Nez Perce County. An argument could be made for including Latah County as well, but the shipments are only about 1% as large as those from Nez Perce County. No other counties provide large enough shipments to merit inclusion in the analysis area.

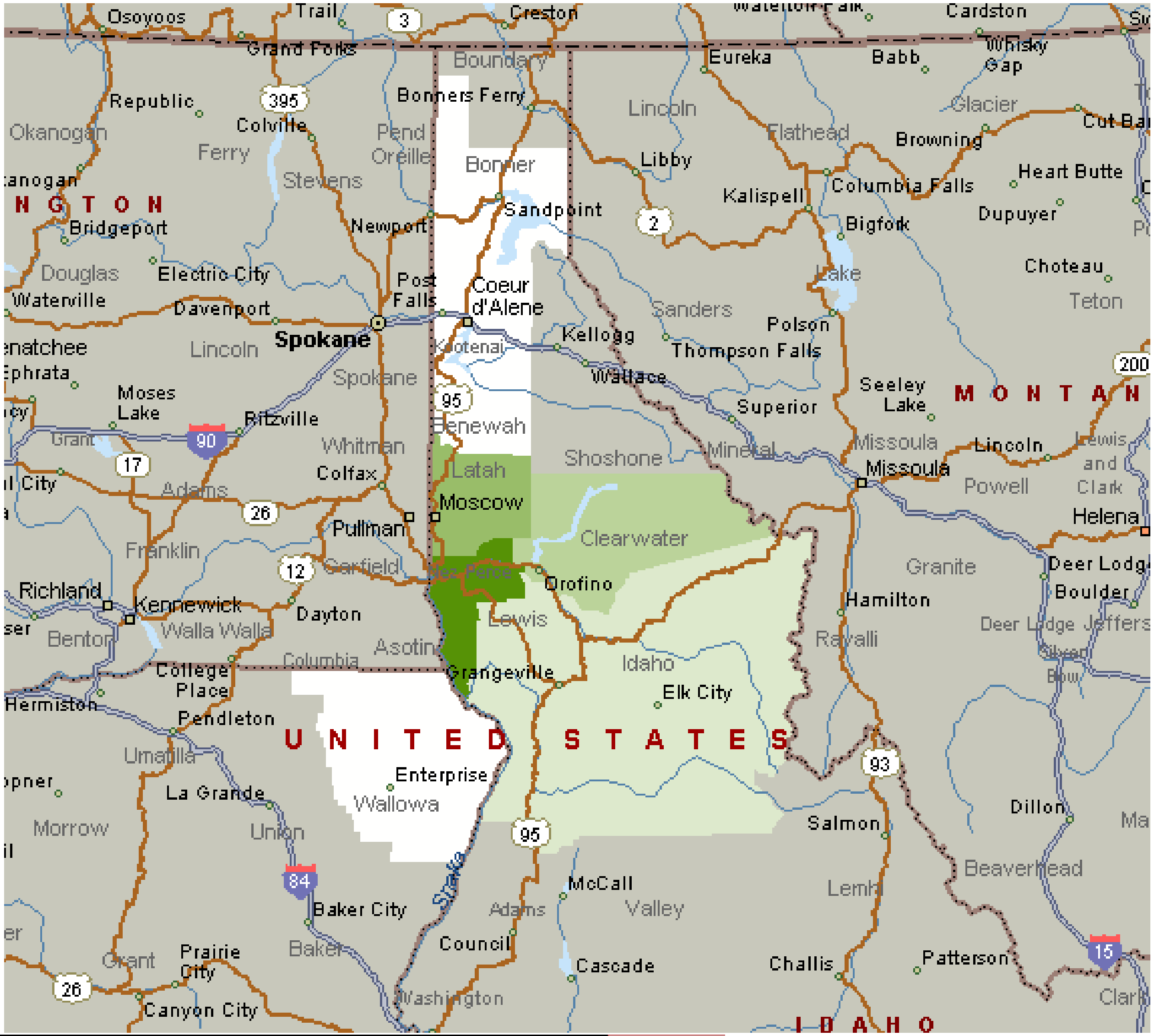
Table 8. Estimated Value and Location of Sawmill Product Commodity (Commodity 112) Shipments to Nez Perce County, ID (2006)

Origin State	Origin County	Dollar Value ($ million)	Commodity Code	Commodity Description	Destination State	Destination County
ID	Benewah	0.000949	112	Sawmills	ID	Nez Perce
ID	Bonner	0.000188	112	Sawmills	ID	Nez Perce
ID	Clearwater	0.043743	112	Sawmills	ID	Nez Perce
ID	Idaho	0.006253	112	Sawmills	ID	Nez Perce
ID	Kootenai	0.000753	112	Sawmills	ID	Nez Perce
ID	Latah	0.168440	112	Sawmills	ID	Nez Perce
ID	Lewis	0.009038	112	Sawmills	ID	Nez Perce
ID	Nez Perce	31.317276	112	Sawmills	ID	Nez Perce
OR	Wallowa	0.000153	112	Sawmills	ID	Nez Perce

Figure F. Estimated Value and Location of Sawmill Product Commodity (Sector 112) Shipments to Nez Perce County, ID (2006)

$Millions

- 🟩 10 to 99
- 🟩 1 to 9
- 🟩 0.1 to 0.9
- 🟩 0.01 to 0.09
- 🟩 0.001 to 0.009
- ☐ 0.0001 to 0.0009



2. Shoshone County, ID

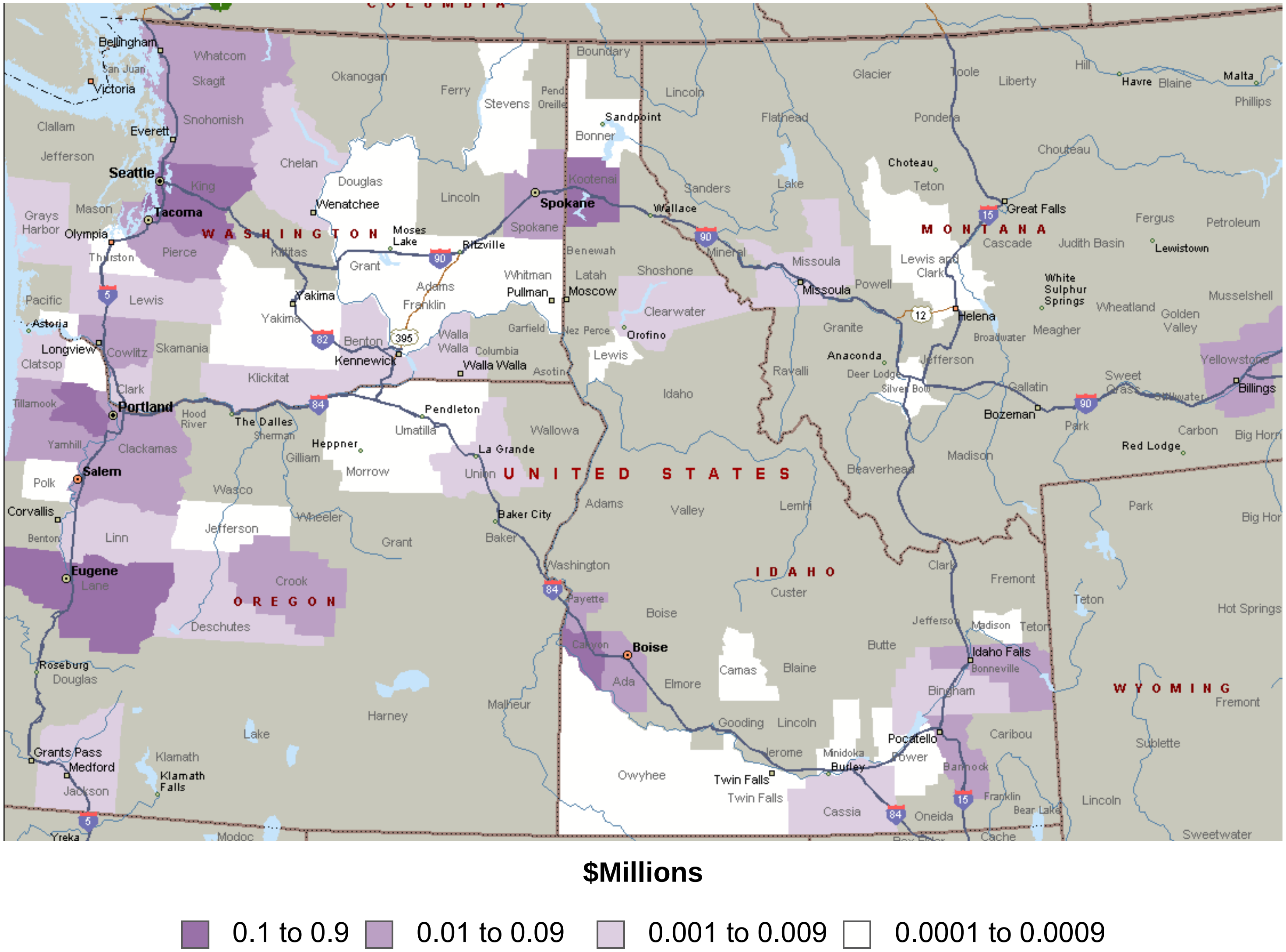
The Lucky Friday silver mine near Mullan, ID has submitted a special use permit request to use NFS land for auxillary operations. These operations will allow the mine to expand production. During scoping, the local economic development council submitted comments stating that mine expansion would provide excellent development opportunities throughout all of northern Idaho, especially for conveyor and construction equipment manufacturers. It is well known that several firms in Kootenai County currently provide critical conveyor and construction equipment to the mine. The Forest Service agrees to analyze the potential impacts. How large an analysis area should be used?

Based on Table 3, conveyor equipment (Commodity 259) and construction equipment (Commodity 292) are the third and sixth largest inputs into silver mine production processes, accounting for eight percent of total production costs. Mine managers were asked to reveal sources of these inputs, but they declined comment. By following the protocol using IMPLAN trade flow data, the likely origins of Commodities 259 and 292 whose destination is Shoshone County, Idaho can be identified. Results from the trade flow report builder may be entered into mapping software. The example is shown in Table 9 and Figure G. While Kootenai County is indeed a large supplier of this commodity, large supplies also come from counties across Washington, Oregon, southern Idaho, and Montana. There are no other counties in northern Idaho that currently provide substantial supplies. Unless the Forest Service analyst, in collaboration with the local economic development council, intended to create new sectors in other parts of northern Idaho to explore development potential, the analysis area should be limited to simply Shoshone and Kootenai Counties. This area best responds to concerns about northern Idaho.

Table 9. Estimated Value and Location of Construction & Conveyor Equipment Commodity (Commodities 259 & 292) Shipments to Shoshone County, ID (2006) (Abbreviated)

Origin State	Origin County	Dollar Value ($ million)	Commodity Code	Commodity Description	Destinatn State	Destination County
ID	Ada	0.059526	259 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Bannock	0.051821	260 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Kootenai	0.115661	268 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Lewis	0.000610	269 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Madison	0.000290	270 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Payette	0.017738	273 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Power	0.000718	274 & 292	Const & Conv mach mfg	ID	Shoshone
ID	Twin Falls	0.000394	275 & 292	Const & Conv mach mfg	ID	Shoshone
MT	Silver Bow	0.000225	278 & 292	Const & Conv mach mfg	ID	Shoshone
MT	Yellowstone	0.072994	279 & 292	Const & Conv mach mfg	ID	Shoshone
OR	Clackamas	0.050807	280 & 292	Const & Conv mach mfg	ID	Shoshone
OR	Clatsop	0.001325	281 & 292	Const & Conv mach mfg	ID	Shoshone

Figure G. Estimated Value and Location of Conveyor & Construction Equipment Commodity (Commodities 259 & 292) Shipments to Shoshone County, ID (2006)



3. Moffat County, CO

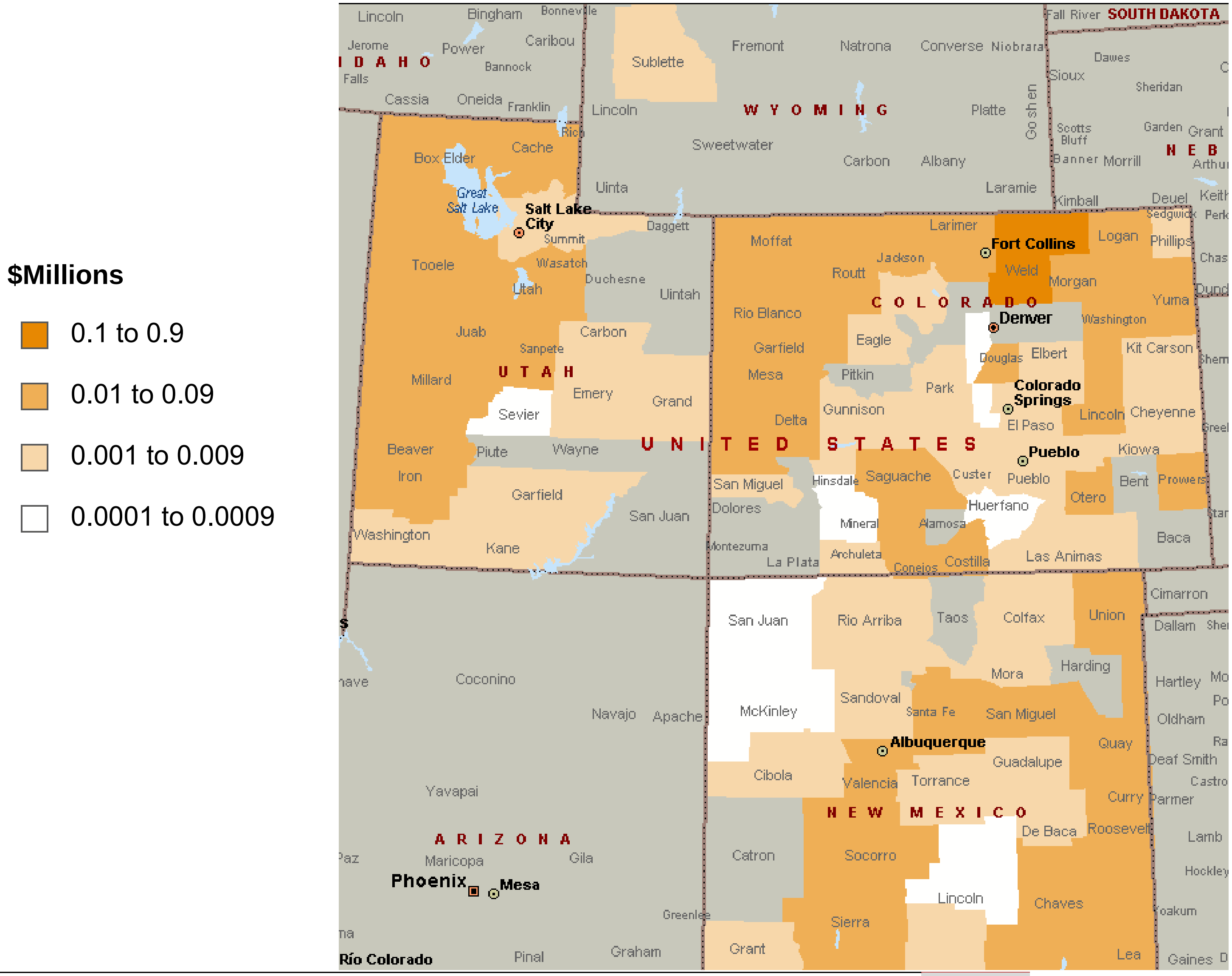
In response to severe drought and degraded watershed conditions, a reduction of authorized grazing on the western reaches of the Routt National Forest is being proposed. It is anticipated that the reduction may be in effect for three years to allow full recovery of watershed conditions. Reduced grazing is expected to increase the demand for additional hay for permittee herds. As part of an economic impact analysis, what counties should be included in the analysis area to capture the effects of additional hay purchases?

Based on Table 3, “All Other Crop Farming” – primarily hay (Commodity 10) – is the second largest input into cattle ranching, accounting for nearly 16 percent of total production costs. The local county extension agent was asked where Moffat County ranchers typically buy hay. The agent’s answer was that hay came from many places both in and out of state, but particular counties were unknown. By following the protocol using IMPLAN trade flow data, the likely origins of Commodity 10 whose destination is Moffat County, Colorado can be identified. Results from the trade flow report builder may be entered into mapping software. The example is shown in Table 10 and Figure H. Other than Weld County, hay is likely to come from eleven counties in Utah, eleven counties in New Mexico, and nineteen counties in Colorado. After consultation with the county extension agent, the analyst decides to limit the analysis to Moffat, Routt, and Jackson Counties. The analyst uses the mapped trade flow information in a narrative to explain likely origins of hay imports to the local area.

Table 10. Estimated Value and Location of Hay and Other Crop Commodity (Commodity 10) Shipments to Moffat County CO (2006) (Abbreviated)

Origin State	Origin County	Dollar Value ($ million)	Commodity Code	Commodity Description	Destinatn State	Destination County
CO	Delta	0.022234	10	All other crop farming	CO	Moffat
CO	Grand	0.006115	10	All other crop farming	CO	Moffat
CO	Jackson	0.011154	10	All other crop farming	CO	Moffat
CO	Jefferson	0.000475	10	All other crop farming	CO	Moffat
CO	Larimer	0.019562	10	All other crop farming	CO	Moffat
CO	Rio Blanco	0.016108	10	All other crop farming	CO	Moffat
CO	Routt	0.013566	10	All other crop farming	CO	Moffat
CO	Weld	0.116486	10	All other crop farming	CO	Moffat
NM	Chaves	0.078347	10	All other crop farming	CO	Moffat
NM	Rio Arriba	0.007085	10	All other crop farming	CO	Moffat
NM	San Juan	0.000132	10	All other crop farming	CO	Moffat
UT	Carbon	0.004103	10	All other crop farming	CO	Moffat
UT	Sevier	0.000106	10	All other crop farming	CO	Moffat
UT	Wasatch	0.035058	10	All other crop farming	CO	Moffat
WY	Sublette	0.004190	10	All other crop farming	CO	Moffat

Figure H. Estimated Value and Location of Hay and Other Crop Commodity (Commodity 10) Shipments to Moffat County, CO (2006)



4. Montrose County, CO

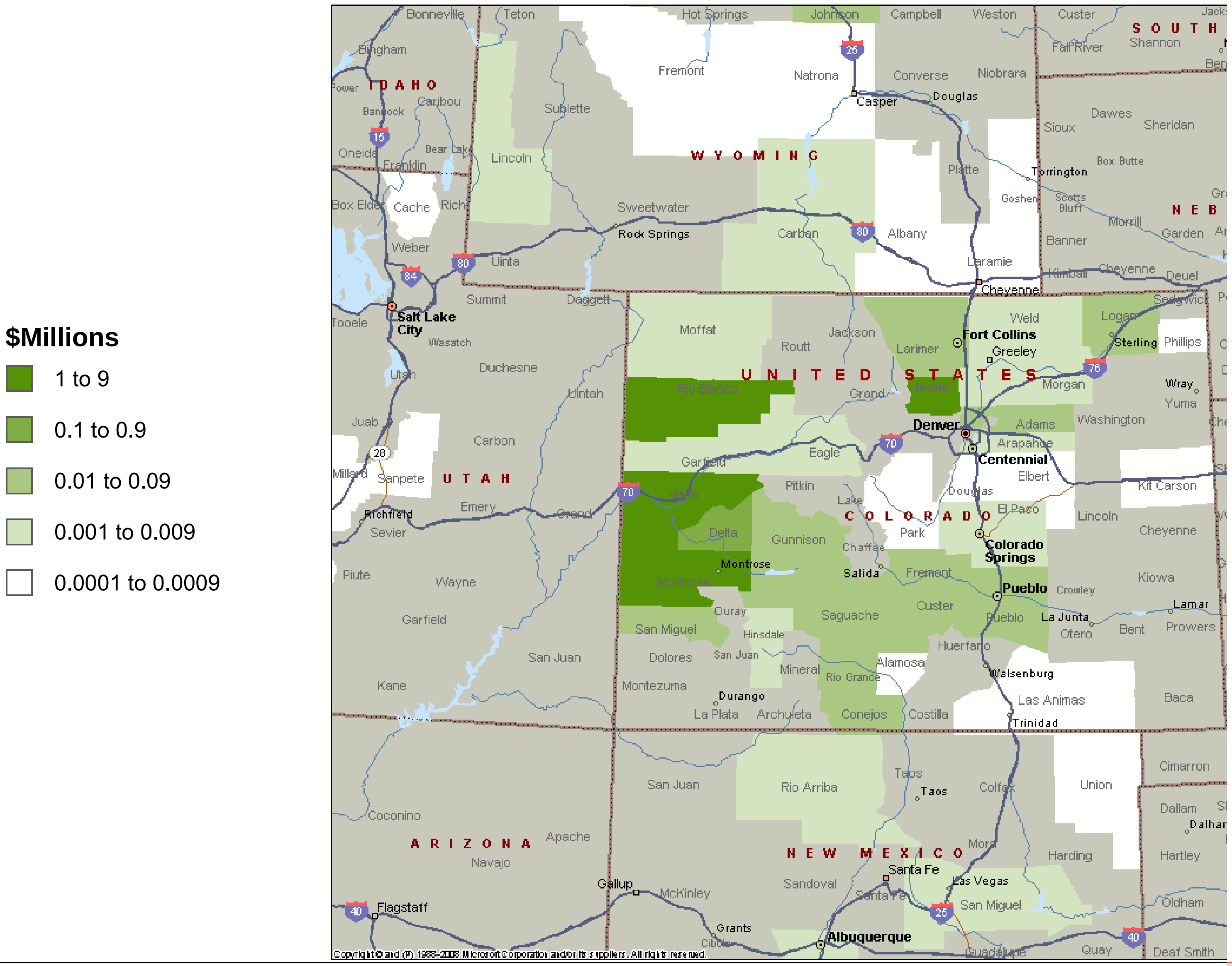
The state legislature is concerned about a shrinking forest products industry, and asks the Forest Service if it can provide an independent estimate of economic contributions provided by the last large sawmill in the state located in Montrose County. All sources of timber – Federal, state, and private – must be accounted for in the estimate. The analysis must be completed within a few hours so that a response can be provided at meetings with legislators the following day. What counties should be included in the analysis area to best account for log deliveries to the mill?

Based on Table 3, "Logging" (Commodity 14) and "Timber" (Commodity 15) are the two largest inputs into sawmills, accounting for nearly 42 percent of total production costs. Logging accounts for log deliveries from independent and contract loggers, while "Timber" (or stumpage) is provided directly from the timber owners, such as the Forest Service. The analyst decides to model for both commodities, since together they account for all timber input to the mill. Mill managers cannot be reached in time to provide detailed input. By following the protocol using IMPLAN trade flow data, the likely origins of Commodities 14 and 15 – Logging and Stumpage – whose destination is Montrose County, Colorado can be identified. Results from the trade flow report builder may be entered into mapping software. The example is shown in Table 11 and Figure I. Boulder, Mesa, Montrose, and Rio Blanco Counties are the largest suppliers, but twelve other counties provide $10,000 or more of product to the Montrose County. After examining the trade flows, the analyst decides to include all counties in western Colorado, and exclude the urban counties along Colorado's Front Range.

Table 11. Estimated Value and Location of Logging & Stumpage Commodity (Commodities 14 & 15) Shipments to Montrose County CO (2006) (Abbreviated)

Origin State	Origin County	Dollar Value ($ million)	Commodity Code	Commodity Description	Destinatn State	Destination County
CO	Boulder	2.913574	14 & 15	Logging & forest products	CO	Montrose
CO	Delta	0.771345	14 & 15	Logging & forest products	CO	Montrose
CO	Garfield	0.002827	14 & 15	Logging & forest products	CO	Montrose
CO	Larimer	0.026911	14 & 15	Logging & forest products	CO	Montrose
CO	Mesa	4.530635	14 & 15	Logging & forest products	CO	Montrose
CO	Montrose	2.481344	14 & 15	Logging & forest products	CO	Montrose
CO	Rio Blanco	1.074327	14 & 15	Logging & forest products	CO	Montrose
CO	Rio Grande	0.036087	14 & 15	Logging & forest products	CO	Montrose
CO	San Miguel	0.043110	14 & 15	Logging & forest products	CO	Montrose
NM	Rio Arriba	0.002089	14 & 15	Logging & forest products	CO	Montrose
NM	San Miguel	0.001615	14 & 15	Logging & forest products	CO	Montrose
UT	Sanpete	0.000418	14 & 15	Logging & forest products	CO	Montrose
WY	Carbon	0.001018	14 & 15	Logging & forest products	CO	Montrose
WY	Johnson	0.010904	14 & 15	Logging & forest products	CO	Montrose

Figure I. Estimated Value and Location of Logging & Stumpage Commodity (Commodities 14 & 15) Shipments to Montrose County, CO (2006)



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Source: UNIVERSITY OF WYOMING submitted to CRIS

RURAL COMMUNITIES AND PUBLIC LANDS IN THE WEST: IMPACTS AND ALTERNATIVES

Sponsoring Institution	National Institute of Food and Agriculture	**Project Status**	TERMINATED
		Funding Source	HATCH
Reporting Frequency	Annual	**Accession No.**	0191715
Grant No.	(N/A)	**Project No.**	WYO-349-00
Proposal No.	(N/A)	**Multistate No.**	W-192
Program Code	(N/A)	**Project Start Date**	Oct 1, 2001
Project End Date	Sep 30, 2006	**Grant Year**	(N/A)

Project Director
TAYLOR, D. T.

Recipient Organization
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Performing Department
AGRI & APPLIED ECONOMICS

Non Technical Summary
Local communities are in conflict over the general directions and specific actions of public lands policy. This project will provide scholarly research, extension, and educational programs that will improve the knowledge base upon which public land management decisions are made. Consistent economic models will be developed for various western states so that

Animal Health Component 85%

Research Effort Categories

Basic	15%
Applied	85%
Developmental	(N/A)

Classification

Knowledge Area (KA)	Subject of Investigation (SOI)	Field of Science (FOS)	Percent
605	0599	3010	25%
605	0599	3080	25%
608	0599	3010	25%
608	0599	3080	25%

Knowledge Area
605 - Natural Resource and Environmental Economics; 608 - Community Resource Planning and Development;

Subject Of Investigation
0599 - Recreational resources, general/other;

Field Of Science
3010 - Economics; 3080 - Sociology;

Keywords

social values
value determination
sociology
government regulation
educational materials
world wide web
public lands
social impact
public policies
case study
workshops
information dissemination
land use
econometric models
policy analysis
regional research
data bases
alternatives
rural communities
federal government
legal aspects
land management

Goals / Objectives
1. Continue to develop and refine economic models and methodologies in Western States to analyze public land issues. 2. Assess the social impacts of public land policies on selected communities and households in western states. 3. Identify the constraints to policy alternatives mandated under existing and proposed federal legislation and policy. 4. Continue to support the Policy Analysis Center for Western Public Lands through memberhsip on the Technical Committee and Project Teams, as requested.

Project Methods
Models developed in Idaho, Oregon, Colorado, and New Mexico will be used as the basis for those to be developed in the other states. Additional funding will be pursued to expand the case studies to additional counties, as specified in the original Fund for Rural America project. Regional models will be constructed and tested in the case study areas in Wyoming. Legal and policy constraints facing western communities, resource users, and others will be identified through a review of existing legislation and federal policies. A paper summarizing this effort will be prepared during the first year of the project. The Policy Analysis Center for Western Public Lands is organized around a Technical Committee that oversees project-specific Project Teams. The Center was created under the aegis of W-192, and the work of W-192 continues to be essential to the long-term research underpinnings of the Center. Project teams will assist Cooperative Extension personnel in educating the public about how public lands affect rural communities. Specified audiences will be supplied with readily accessible educational materials outlining how communities function with respect to public lands. The computer-based economic models will be combined with a set of educational aids to develop an educational package for use throughout the West. In addition to traditional bulletins, workbooks, and workshops, informational databases will be created as interactive learning tools for community members, policy makers, land managers, and others. These allow audiences to examine scenarios from other communities concerning potential ecological, economic, and social impacts of proposed public land management policies. Much of this material will be made available through the PACWPL website (http://www.agecon.nmsu.edu/center/Index.htm), white papers, and other output from the Center.

Progress 10/01/01 to 09/30/06

Outputs
OUTPUTS: Ranch-level models reflecting the impacts of limited access to federal grazing were completed (as proposed for the Fund for Rural America project due the summer fo 2002). In addition, two reports were prepared by the PACWPL technical committee. The first dealt with the pinyon-juniper pine as a potential energy source. The second dealt with the potential listing of the sage grouse as an endangered species. A proposal has been written for submission to the BLM and FS Joint Fire Science Program. A large multi-disciplinary project addressing fire danger in the Great Basin is underway. Another proposal dealing with ranch-level analysis, regional analysis, environmental values, and social impacts of fire and control alternatives on cheatgrass and juniper infested rangelands is also in preparation. The Policy Analysis Center for Western Public Lands (PACWPL) (Objective 4 of W-192) released a report on the sage grouse and how that population might be maintained. In addition, there have been numerous ranch and regional policy models developed (i.e., input-output, computable general equilibrium (CGE), and various linear programming models. The New Mexico component of the ranch value study underway in several states has been submitted to JARE (in for 2nd review). Arizona is planning on conducting a ranch values study also similar to those done in New Mexico and Idaho. A number of regionally funded projects (through the Fire Science Program involving USDA and USDI) are underway. The existing GAMS ranch-level model is being enhanced for this additional work. The A to Z Retained Ownership program has now been operating for 13 years in Idaho. This program has benefitted ranchers who have participated by garnering additional profits. Economic impact analyses related to federal

livestock grazing have been completed for Park County, Wyoming. The Bighorn National Forest plan was revised with the help of Taylor (Wyoming). Analyses of economic impact of livestock grazing, oil and natural gas development and production, and recreation on the economy of the surrounding region were completed for two Resource Management Areas in Wyoming (Casper and Kemmerer). PILT (Payment in Leu of Taxes) fact sheets were developed for each county in Wyoming. In Oregon, work has begun on beef cattle management to improve riparian areas and ranch economics. Additional work has been completed regarding the evaluation of social and economic impacts of public land policy. An evaluation of the control of Cheatgrass in the sagebrush biome has also been initiated. Work in the area of risk management ("www.rightrisk.org) has been understaken in Arizona. Finally, the relationship between recent state predator control efforts on federal lands and the Alaska National Interest Lands Conservation Act (ANILCA) and National Environmental Policy Act has been examined. Several procedural oversights have been identified. PARTICIPANTS: See W-192 report in NIMSS TARGET AUDIENCES: See W-192 report in NIMSS PROJECT MODIFICATIONS: Nothing significant to report during this reporting period.

Impacts

The first scientific analysis of the sage grouse population and potential ways to stop its decline was produced and made available to decision-makers. Impacts of proposed changed in public land policy have been estimated for a number of states in the west using various models. Hedonic models of ranch sales have been developed showing the values intrinsic to ranching as opposed to those associated with ranch livestock production. Impacts of proposed changes in public land policy have been estimated for a number of states in the west using several different modeling approaches. Hedonic pricing models of ranch sales in Idaho and New Mexico continue to show that the price of the ranch is tied to values intrinsic to ranching rather than those associated with actual livestock production. Ranch-level models were developed and used for a variety of purposes including (a) animal distribution practices, (b) profit maximizing treatments of western juniper using stochastic cattle prices and rainfall patterns, and (c) used in the revision of three National Forest plans in northeastern Oregon in order to best meet ecological, economic, and social needs of the region and country. Results of the White Pine and Eureka (Nevada) county studies have been used by the BLM and county governments in their Resource Planning process, particularly in relation to water allocation issues. An examination of the predator control processes consistent with the Alaska National Interest Lands Conservation Act and the National Environmental Policy Act will allow federal land managers in Alaska to avoid legal challenges. The multi-period GAMS LP model developed as part of this project continues to be used for policy analysis by several western states, particularly with respect to livestock distribution on rangland. The conclusion of the ranch value research in New Mexico has been that both deeded and public land acreage addes to ranchland value irrespective the livestock grazing capcity and income earning potential of the land. Empirical evidence does not support the traditional cost capitalization model. The analysis of intensive management has provided federal land managers with a clearer understanding of their duties and responsibilities and provided state managers with a better understanding of the laws that constrain their federal counterparts. Results of study for Elko County Commissioners have also been accepted as input by U.S. Forest Service in their development of an EIS. In addition an additional study to estimate the county-wide economic impacts of rangeland fires in Elko County is being conducted. In addition a study has been commissioner to investigate potential economic impacts of changes to Elko and Eureka counties from proposed changes in the 1872 Mining Law. Work on the economic impact of various development alternatives in Wyoming have facilitated a rational development process for the inherent conflicts between public lands and the emerging gas and oil development.

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Progress 01/01/05 to 12/31/05

Outputs

Budget data was collected from cattle producers in Park County. This information was used to develop a multi-period linear programming model of Federal grazing dependent cattle operations in Park County. The framework for this linear programming model was developed through the W-192 Regional Research Project. Results from the linear programming model indicate that net ranch income declines by 9.4 percent with a 10 percent reduction in Federal grazing, 24.8 percent with a 25 percent reduction in Federal grazing, 54.9 percent with a 50 percent reduction in Federal grazing and 91.9 percent with a 100 percent reduction in Federal grazing. As a second part of this project a modified IMPLAN model of Park County was used to estimate the community impact of Federal grazing in the county. The results from this model indicated that depending on assumptions Federal grazing supported between 70 and 344 jobs and $1.7 and $8.4 million in labor earnings in Park County. The project also found that agricultural land accounts for 30 percent of elk winter range, 40 percent of antelope winter range, 76 percent of whitetail deer yearlong range, and 49 percent of mule deer range. Finally, the project found that replacing 35 acres of agricultural land with one average size household generates more county revenues, but also considerably more county expenditures. For every dollar of tax revenue generated an average of $2.35 of expenditures was incurred by the county.

Impacts

This information has been used to increase community awareness regarding the economic importance of Federal livestock grazing in Park County. The report is currently being used as an input for the Shoshone National Forest planning process. It is also anticipated that it will be included in the forthcoming Worland and Cody Resource Management Areas planning efforts. Also, as a result of this effort a request for a similar project has been received from Hot Springs County. In addition based on the results of this project, the economic analysis for the Bighorn National Forest Plan was expanded to include a more complete evaluation of the economic importance of livestock grazing on the forest.

Publications

- Taylor, D., Coupal, R. and Foulke, T. 2005. The Economic Impact of Federal Grazing on the Economy of Park County Wyoming, University of Wyoming, Department of Agricultural and Applied Economics, August 2005.
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Ranch-Level Impacts of Changing Grazing Policies on BLM Land to Protect the Greater Sage-Grouse: Evidence from Idaho, Nevada and Oregon

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The mission of the Policy Analysis Center for Western Public Lands is to help rural communities, policy makers, resource managers and users, and others understand, analyze and engage effectively in the public land policy process. The Center will provide relevant, science-based information and analysis of ongoing and proposed public land management policies.

Table of Contents

1. Introduction

The greater sage-grouse (*Centrocercus urophasianus*) is widely discussed as a candidate for listing under the Endangered Species Act (ESA). Biologists, conservation groups and government organizations have documented sage-grouse population declines and the apparent reasons for these declines, and have made recommendations for how to recover the species (see, for example, American Lands Alliance 2002, Connelly et al. 2000, USDI-BLM 2000 and 2001). Most states have convened local sage-grouse working groups to develop sage-grouse recovery plans built on collaboration across agencies and communities (see Nevada Sage-Grouse Project 2001, USDI-BLM 2001). Suggested conservation actions include educational programs about the species, mapping of sage-grouse habitat and distributions, research to evaluate how to manage and improve sage-grouse habitat, and habitat-restoration programs to recover the species and maintain habitat quality (Connelly et al. 2000, USDI-BLM 2001). Some proposed actions include significant changes to livestock grazing, and many biologists and environmentalists believe livestock grazing is the single greatest threat to sage-grouse (Clifford 2002).

A Memorandum of Understanding (MOU) between the Western Association of Fish and Wildlife Agencies (WAFWA), the U.S. Department of Agriculture, Forest Service (USFS), the U.S. Department of the Interior, Bureau of Land Management (BLM), and the USDI Fish and Wildlife Service (FWS) was signed in 2000. This MOU provided for the establishment of a team of representatives from the federal agencies and four states (Nevada, Idaho, Montana and Wyoming) to coordinate state and federal efforts to conserve sagebrush and sage-grouse. Specifically, the states and agencies agreed to consider, among other things, the WAFWA Guidelines to Manage Sage-Grouse Populations (Connelly et. al. 2000) in designing recovery plans for sage-grouse. These guidelines call for recovery plans that use local working groups to identify and solve regional problems related to the grouse. Local differences in conditions that affect sage-grouse populations may occur and Connelly et al. (2000) suggests these local differences should be considered in conservation plans.

Most management actions in completed state and regional sage-grouse plans are general and could apply in varying degrees to almost any area of the sagebrush ecosystem. This generality makes an assessment of potential impacts stemming from management changes impossible until local and specific courses of action are defined. One possible exception is livestock grazing.

Relatively healthy populations of sage-grouse occur in habitats grazed by domestic livestock, and grazing management in these areas results in habitat characteristics that support sage-grouse populations. However, low density or declining sage-grouse populations also occur in some areas characterized by a depleted herbaceous understory that may be the result of past or present grazing practices. Changes in grazing management may be necessary to increase sage-grouse populations, but experimental data are lacking to guide management decisions.

The political discussion surrounding livestock grazing and sage-grouse recovery is intense (see Clifford 2002). In many western states, the BLM lists the sage-grouse as a "sensitive species," and USFS defines it as a "management indicator species." This obligates these agencies to account for the needs of sage-grouse populations in their planning and management decisions. Management of public lands for the needs of livestock and sage-grouse will, at a minimum, require changes in land-use policies and goals. These changes are likely to occur even if an Endangered Species Act listing is postponed.

An example of these changes is a recent appeal by the National Wildlife Federation of a USFS environmental assessment (EA) on the Big Sheep grazing allotments in the Beaverhead-Deerlodge National Forest in Montana (National Wildlife Federation 2001). The appeal was based on two essential points. First, the appellants asserted that the USFS had failed to monitor sage-grouse populations over time on the grazing allotments in question. Second, the agency concluded that continuation of current grazing programs and maintenance of upland range improvements would have no significant impact on sage-grouse, even though the agency had virtually no population information for sage-grouse. The appellants argued that, because sage-grouse population data was lacking, this decision violated federal law. They requested that a "sage-grouse" alternative be added and the EA process be repeated with this alternative considered. The proposed alternative did not include elimination of grazing. It contained two main objectives (National Wildlife Federation 2001, p. 16):

> 1."...fully implement the *Guidelines to Manage Sage-Grouse Populations* (Connelly et al. 2000) by adopting range utilization standards that provide optimal breeding habitat and protect summer and winter habitats. Such an alternative would have forage utilization standards of around 25% (well

> below current levels), would avoid the construction of new water developments, and would assess whether elk winter range utilization was negating the effects of livestock utilization standards."
>
> 2."...reduce or eliminate the existing upland water developments and fences."

Sage-grouse is a management indicator species for the USFS and this appeal constitutes an example of how that management status will confront land agencies with demands to modify grazing use to meet the habitat needs of sage-grouse. Modifications to forage utilization, existing and potential range improvements and changes in grazing seasons in the name of sage-grouse are within the realm of likely policy changes.

Sage-grouse habitat needs for breeding, nesting and brooding coincide with the periods when cattle are grazing on public lands (Connelly et al. 2000). Thus, the habitat needs of the grouse will likely constitute a benchmark against which management policies will be judged under both the threat of and the event of an ESA listing. If sage-grouse habitat does not meet this benchmark, it is our conclusion that reductions in grazing on public lands (such as the 25% forage utilization limit mentioned in the USFS appeal discussed above) is as likely to occur as any other management change.

Given the continuing controversy and efforts to list the sage-grouse under the ESA, the Policy Analysis Center for Western Public Lands (PACWPL) was asked to evaluate policy alternatives and the implications of an ESA listing for both the sage-grouse and for affected human communities. This paper provides an analysis of potential ranch-level impacts from altered livestock grazing uses on public lands.

1.1. Impact Alternatives Considered

During the spring, sage-grouse chicks need herbaceous cover for protection. Forbs are particularly critical to their diet during this period (Connelly et al. 2000). While the condition of spring habitat is critical for the survival of sage-grouse chicks, this spring period is also critical for forage and livestock production. In this paper, we estimate the value of BLM spring forage for livestock production. We also estimate the economic consequences of eliminating spring grazing and reducing grazing capacity on BLM lands so as to improve and maintain habitat for sage-grouse. The projected economic consequences of two policy changes (i.e. eliminating spring grazing and reducing federal land allotments) would be applicable for numerous other endangered species and land-use issues where similar policy changes have been suggested. The answer is generic in its application.

Economic options available to many ranchers are to use deeded lands and meadows more intensively as grazing alternatives to public lands. Unfortunately, these same acreages are often prime habitat for sage-grouse, and adjusting seasons of use and stocking levels on deeded rangelands and meadows could be counterproductive. We make no judgment about whether the adjusted grazing strategies determined to be economically optimal with altered public land grazing policies would actually benefit sage-grouse. Our purpose is to provide an estimate of the economic value of public land forage potentially lost to representative ranches in each of three study states: Idaho, Nevada and Oregon.

2. Literature Review

2.1. Removal of Spring Grazing

On western ranches, the typical harvest pattern for forages and raised feeds, and level of dependence on western rangelands, varies by season. In northern climates where rangelands are grazed seasonally during the spring, summer and fall, a typical seasonal grazing use pattern may include feeding hay in November or December and continuing until March, April or early May when livestock are moved to BLM and state trust lands. During the summer, livestock may be moved to USFS permits or remain on BLM and state trust lands. As hay harvest is completed and temperatures cool in the fall, cattle are moved back to the ranch headquarters, grazing deeded lands and hay aftermath until the cycle starts again.

Rangelands traditionally provide a substantial amount of forage during selected seasons for many western ranches. If a ranching operation is permitted for yearlong grazing on public lands, as is typical in New Mexico and Arizona, a decrease in allowed federal grazing would likely reduce production in the same proportion as the decrease in available public AUMs. If the ranch is dependent seasonally on federal forage, a reduction in federal AUMs may create forage imbalances and produce a greater reduction in grazing capacity than just the loss of the federal AUMs.

The federal government has recognized the varying seasonal importance of federal grazing in many parts of the West. The 1986 Grazing Fee Review and Evaluation report (USDA/USDI 1986, p. 3) states:

> In numerous local areas in the West, the operating size of many livestock operations often is affected by the amount of federal range available during seasons of feed shortage on privately owned lands. Such critical periods may occur in the fall prior to hay feeding, in the summer when forage on private lands is low in nutritive value compared to forage on public ranges at higher elevations, and in the spring when private lands are needed to produce next winter's feed.

The impacts of eliminating or reducing spring grazing will depend on ranch resources and the substitute forage alternatives that are economically available. Obviously, the winter feeding period could be extended if spring grazing was eliminated, but this would increase feed costs. In many cases it would mean spring hay feeding would have to move from meadows to other areas so irrigation water could be applied.

Leased private lands might be available in the spring if public land grazing capacity were reduced, but in many cases additional grazing forage could only be leased by shipping livestock a substantial distance and with a substantial increase in feed costs. Marginal hay land could be converted to pasture and grazed, and grazing use of deeded rangelands and existing improved pastures could be adjusted by season where possible. However, in most cases there is little flexibility to implement seasonal changes in grazing use, and herd size reductions may be the only alternative, at least in the short run.

Some research on the economics of reduced or eliminated federal land grazing is available. Greer (1994) found that the reliance of southeastern Oregon ranchers on public lands can appear insignificant when calculated on an acreage or AUM basis, but, when calculated on a seasonal dependency basis, federal grazing is quite important. Taylor et al. (1992) found that, in Colorado, federal forage meets only 25% of annual forage requirements; yet, over 50% of summer season forage is obtained from federal lands.

Cook et al. (1980) found that changes in spring use had a greater impact on livestock sales per AUM for Colorado ranchers than did AUM changes in any other season. Van Tassell and Richardson (1998) also found that spring and summer forage obtained from public lands was critical to the operation of federally based ranches in Wyoming. Similarly, Torell et al. (1981) found the same situation for public land ranches in northern Nevada. Optimal production strategies and ranch income were not exceptionally sensitive to increases in the grazing fee, but production and net returns changed substantially when federal AUMs were removed from any season, particularly the spring season.

If an altered land-use policy means that grazing will not be allowed during the spring period, but the number of public land AUMs allowed for grazing is not correspondingly reduced, it is possible that eliminating spring grazing and shortening the allowed grazing period on public lands would increase optimal herd sizes. Torell et al. (1981) estimated this would be the situation for northeastern Nevada ranchers when spring grazing was eliminated. Given the cost/price definition of the analysis, the profit-maximizing strategy was to make up lost public land AUMs during the spring period by feeding more hay and to substitute other forages where possible. Net returns were reduced, but it was most profitable to use BLM AUMs previously grazed during the spring in other seasons and to expand herd size. For other ranches with few low-cost alternative sources of forage, optimal herd size could decrease with the elimination of spring grazing.

2.2. Allotment Reductions

Linear programming (LP) and ranch budgeting procedures have been used to estimate the seasonal value of public land forage (Bartlett 1983, Gee 1983, Hahn et al. 1989) and to estimate economic impacts from changes in federal land policies (Bartlett et al. 1979, Gee 1981, Perryman and Olson 1975, Rowe and Bartlett 2001, Torell et al. 1981, Van Tassell and Richardson 1998). All of these earlier LP models were single-year models that considered production under some defined average cost/price situation. Typical or representative ranches were defined from available cost-and-return studies in the various study areas. These studies found reductions in income and net ranch returns were not proportional to reductions in federal forage. The rigidity of seasonal forage availability meant the optimal use of other forages and resources were impacted when federal AUMs were removed. Other forages were reallocated to offset part of lost federal forage (Gee 1981, Van Tassell and Richardson 1998).

Gee (1981) and Hahn et al. (1989) used LP to estimate forage value on BLM and USFS lands. Forage values in 1981 were estimated to be $10.86/AUM for BLM and $11.58/AUM for USFS (Gee 1981). Hahn et al. (1989) updated Gee's work and reported forage values for each of nine USFS regions and as a national average. Values ranged from $9.22/AUM in Region 3 (New Mexico and

Arizona) to $15.11/AUM in Region 5 (California). Van Tassell and Richardson (1998) reported much higher values for BLM and USFS AUMs. For the Wyoming ranches studies, complete elimination of the BLM permit was estimated to decrease annual net cash income by an average of $55/BLM AUM removed. Eliminating the USFS permit decreased annual net returns by a similar amount, $52/AUM. At the other extreme, because some western ranchers are not necessarily in the business to make a profit and spend more than they justifiably should to produce livestock, Rowe and Bartlett (2001) found that eliminating federal grazing permits in Colorado would actually benefit some ranchers by forcing them to reduce the size of their money-losing livestock enterprise. Economic changes from allotment adjustments varied widely, ranging from a loss of $40/AUM to a gain of $27/AUM when herd reductions were the assumed adjustment strategy.

3. Methods and Procedures

We define the economic situation, typical resource base, production rates and practices for western ranches in three areas in the West: Owyhee County, Idaho; Northeastern Nevada; and Lake County, Oregon. Representative ranches in these areas were selected because livestock cost-and-return estimates and policy impact models had been developed for these areas. Additionally, ranches in these areas provide sage-grouse habitat and are dominated by the sagebrush rangeland type.

Data from cost-and-return studies were used to build multi-period linear programming (LP) models to evaluate how optimal (profit-maximizing) production strategies would change as permitted grazing use on public land changes. The specific ranches considered included medium-sized (300 cows) ranches in the Jordan Valley area of Owyhee County, Idaho; large ranches (720 cows) in northeastern Nevada; and large ranches (500 cows) in Lake County, Oregon.

The economic analysis was completed in four steps. First, ranch-level data defining typical production practices, production rates and production costs were gathered from group interviews with area ranchers (Darden et al. 2001, Rimbey et al. 1998, Oregon cost-and-return studies have not yet been published). Second, a multi-period linear programming model was developed to depict the production processes of each representative ranch. Published cost-and-return studies that provided baseline cost data were for either the 1997 or 1998 production years. All prices were adjusted to real 1997 levels.

An initial baseline optimization was estimated for each model ranch. This was followed by additional optimizations that evaluated profit-maximizing production strategies under different policy scenarios. The estimated impact of changes in land-use policies is then the difference in optimal herd size, forage use and economic returns as compared to the baseline.

The projected economic consequences of two policy changes, elimination of spring grazing on BLM land and BLM allotment reductions, are evaluated. For eliminating spring grazing, we considered the removal of the first month of grazing. Spring grazing dates considered varied between the representative ranches because typical turn-out dates are different for each ranching area and ranch model, but in all cases the defined spring period would correspond to a period of critical concern for sage-grouse. During these spring months, sage-grouse use sagebrush habitats for breeding, feeding, roosting, nesting and rearing young. Available sagebrush, herbaceous cover and insects are considered to be critical for sage-grouse chick survival during the spring period (Connelly et al. 2000).

Allotment reductions considered included a 50% reduction, 75% reduction and total elimination of available BLM AUMs. The actual reduction level that might be necessary to improve sage-grouse habitat on a particular allotment, and alternative management options that could be used to minimize the disruption of grazing uses, will be site specific and variable. Further, reduction levels considered in the analysis may not be adequate because of the inter-dispersed nature of land tenure on many western ranches. State trust lands are often small, scattered parcels located with the BLM allotment, and private lands are also scattered within allotment boundaries. The Jordan Valley, Idaho model, for example, was defined to have state trust lands in addition to BLM lands, but the exact location of these lands was not defined. Elimination of spring grazing or reductions in federal land grazing may mean elimination or reductions on these other lands as well.

Each representative ranch has different amounts and types of resources defined to be available for grazing, and different options for replacing public land forage. Substitute forages and strategies considered to be available as BLM allotment grazing capacity was reduced included leasing outside private forage, converting native meadow hay land to irrigated pasture, extending the hay feeding period, and reducing the size of the cow herd. These alternative forage sources were considered to be available during selected seasons for both the base run and for additional policy impact runs. Converting hay land to pasture was not considered an option in the Oregon model because of the improved meadow and meadow hay produced.

We considered two alternative analyses for the elimination of spring grazing on BLM land. The first scenario was restrictive but may be most realistic in many cases because of limited opportunities to develop forage substitutes. This scenario considers only the options of feeding hay or reducing herd size. The second scenario allowed leasing outside private AUMs, converting hay land to pasture, moving the season of use of all deeded land to the spring, extending the winter feeding period, and reducing herd size.

We considered reductions to the BLM allotment to be phased in over five years in equal increments. The first 1/5 of the reduction was considered to occur during the second year. Results reported for optimal number of BLM AUMs used started with the sixth year when the full reduction had been implemented.

3.1. Linear Programming Model Description

The policy impact models used in this analysis were developed in five states and are structured for western livestock ranches that rely on both deeded and public lands for grazing capacity. A limited number of crop-raising alternatives are included in the models, but only as these crops provide forage, crop residue and feed for livestock production.

The net present value (NPV) of discounted net annual returns (profits or gross margin) is maximized over a T-year planning horizon subject to linear constraints that define resource limitations and resource transfers between years. Seasonal forage supply and demand is explicitly considered.

Figure 1 illustrates the general structure of the constraint set for the LP models during a given year t. Equations are discussed from top to bottom in the figure. A ranch has available a given set of cropland and rangeland for harvest and grazing. Each type of land is restricted at a level at or below some available upper limit, and that is the first block of equations in the model. Also considered in this block is recognition that certain forages will be restricted in use to only selected seasons, because of regulation, physical availability or production limitations.

The next block of equations is included to

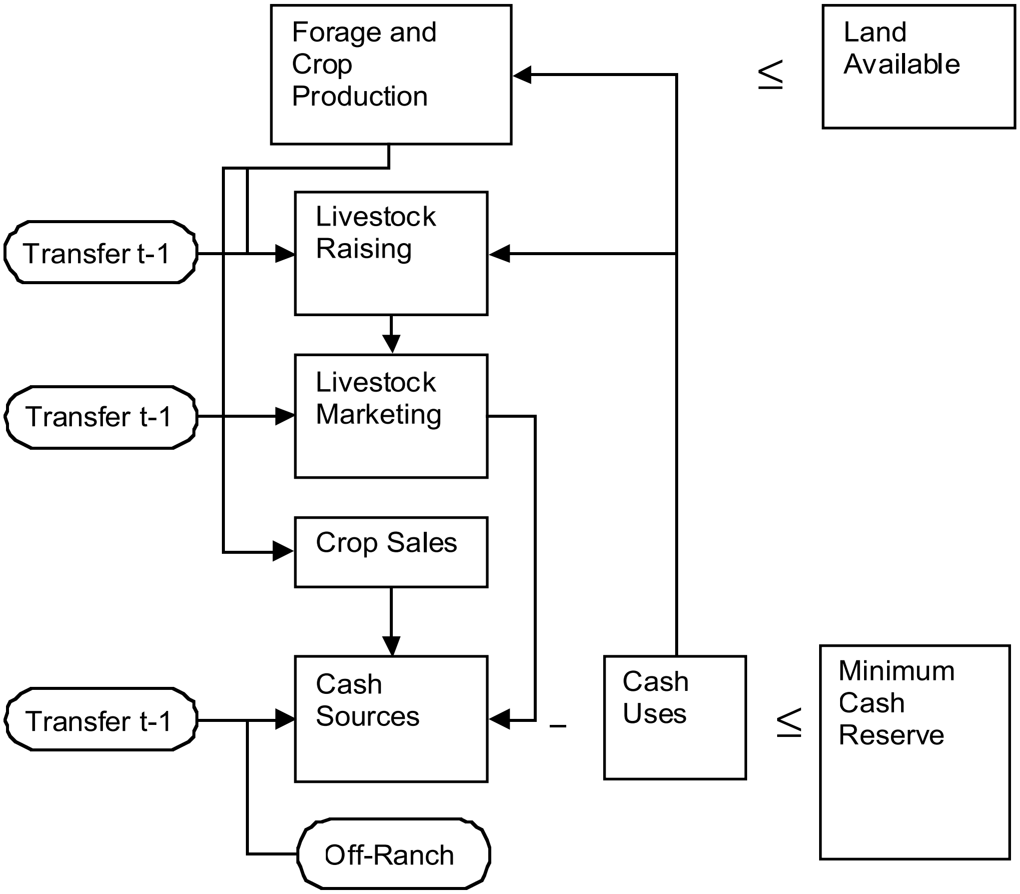

Figure 1. LP model constraint structure.

transfer forage and crop production to livestock-raising activities and crop-selling activities. Within the livestock-raising block are equations that define the required ratio between different animal classes. Some examples: bulls must be included based on a specified bull-to-cow ratio and the specified calf crop defines the number of young animals available for sale and herd replacement.

Seasonal forage requirements for each animal class are calculated based on defined animal unit equivalencies (Table 1) and the length of each grazing season. Equations are also included that transfer brood animals from the previous year. Typical animal death loss and the relative number of different animal classes are considered at the time of the transfer. The livestock-marketing block includes equations that transfer between livestock-raising and livestock-selling activities. Yearling animals are carried over from year t-1 to year t; this is another inter-year linkage in the model.

Table 1. Animal unit equivalencies used to calculate seasonal forage requirements [from Vallentine (1990)].

Animal Class	Animal Unit Equivalency (AUE)
Brood cows	1.00
Bulls	1.25
Horses	1.25
Weaned calves	0.50
Yearlings	0.75

The next equations define the cash flow constraint. Crop and livestock sales generate income and are a source of cash. Livestock-, crop- and forage-raising activities use cash. The cash constraint requires that a cash reserve be maintained so as to cover variable production expenses, fixed ranch expenses, family living expenses, loan obligations and an annual cash residual. Excess cash at year t-1 can be transferred to year t, and in fact it is implicitly assumed that any excess cash from a "good" year will be transferred to cover expenses and cash shortfalls in future years. Other sources of cash include off-ranch income and annual borrowing. Any funds borrowed must be repaid during the next year. Borrowing is not allowed during the last year and all debt obligations must be paid in full by the end of the T-year planning horizon. While numerous equations are included to define the production and economic processes of the representative ranch, forage resources and available cash ultimately determined the level of production possibilities.

Torell et al. (2001) and numerous other studies reviewed in that paper highlight that western ranchers do not have profit maximization as the primary goal; rather, they ranch for the way of life and the desirable attributes of rural living. As noted by Van Tassell and Richardson (1998), western public land ranchers will, for the most part, continue to ranch until forced to do something else. How, then, do we justify using profit maximization as our model objective? First, the utility-maximization model that ranchers subscribe to is impossible to measure and quantify. Individual ranchers and ranch families have differing levels of commitment to the ranching lifestyle and decreasing annual ranch income through altered land-use policies can be expected to dampen enthusiasm for ranching to varying degrees. It will not be possible to predict how many ranchers a particular land-use policy will force out of business (Torell et al. 2001).

The profit-maximizing objective provides a measurable criterion against which to judge policy changes. It is tempered by considering only investment alternatives related to ranching and livestock production, and by including cash flow restrictions. The LP model determines the optimal production strategy with the current policy prescription and how optimal production changes with a new policy. The implicit assumption is that ranch families will continue to consider only the limited investment opportunities associated with the ranch property; they prefer more money to less; and will continue to ranch until cash flow restrictions can no longer be met and they are forced from the business.

3.2. Representative Ranches

Table 2 summarizes forage resources, typical production rates and costs, and forage harvesting alternatives defined for each of the representative ranches. The grazing seasons and the seasons when alternative forages were considered to be available for grazing are defined in Table 3. Grazing seasons were defined based on typical turn-out dates, potentially adjusted turn-out dates and livestock marketing dates. Notice that the cost per unit of harvesting both federal and private forage (Table 2) includes both fee and non-fee grazing costs (e.g. herding cattle, checking cattle, improvement maintenance) as estimated by Van Tassell et al. (1997) and Van Tassell and Richardson (1998). The cost of leasing private rangeland in Nevada was considered to be exceptionally high ($30/AUM) because little private forage is available for lease in the state and this activity would require high non-fee costs because of the distance to available private leases.

Table 4 presents the assumed productivity of rangeland and pasture resources for each of the

Table 2. Characteristics and resources of the representative ranches.

		Number of Units			Objective Function Cost ($/unit)		
	Units	Idaho	Nevada	Oregon	Idaho	Nevada	Oregon
Land resources owned							
Alfalfa hayland	Acres			90			400.00
Native meadow hayland	Acres[a]	325	800	290	50.00	50.00	97.00
Convert meadowland to pasture	Acres[a]	325	800		13.75	12.50	
Deeded rangeland	AUMs	240	115	600	3.25	3.25	3.25
Land resources leased or purchased[b]							
State trust land	AUMs	144			10.64		
BLM	AUMs	2,098	4,148	2,400	7.19	7.19	7.19
USFS	AUMs			2,560			9.46
Private leased land	AUMs	500	500	500	13.25	30.00	13.25
Purchase alfalfa hay	Tons		Unlimited		100.00	85.00	120.00
Purchase meadow hay	Tons		Unlimited		NA	70.00	85.00
Sell alfalfa hay	Tons		All available				100.00
Sell meadow hay	Tons		All available		55.00	55.00	65.00
Livestock resources[c]							
Animal units yearlong	AUY	333	700	607			
Brood cows	Head	286	602	511	68.75	62.40	9.88
Replacement heifers	Head	65	120	86	68.75	62.40	9.88
Bulls	Head	19	36	29			
Horses	Head	6	12	10			
Miscellaneous income/expenses							
Fixed ranch expenses	$				24,430	33,361	25,432
Family living allowance	$				24,000	24,000	24,000
Off-ranch annual income	$				30,000	10,000	10,000
Required minimum cash reserve	$				500	500	500
Efficiency measures[d]							
Calf Crop (Calves born as % of Jan. 1 cow inventory)	%	88	85	90			
Calf death loss	%	4	3	4			
Cow death loss	%	2	2	2			
Bull death loss	%	1	1/2	1			
Steer calf sale weight	lb	440	475	525			
Heifer calf sale weight	lb	390	435	450			
Heifer yearling sale weight	lb	800	750	850			
Cull cow sale weight	lb	950	950	1,100			
Cull bull sale weight	lb	1,800	1,450	2,000			

[a]/Converting hayland to grazable pasture is not generally practiced but is a possible source of forage if public land AUMs are removed. This conversion would use some of the available hayland and thus would reduce the land available for crop production. The cost of the conversion was estimated by Van Tassel and Richardson (1998).

[b]/In addition to the $1.35/AUM grazing fee that has been paid for public land grazing in recent years, grazing costs shown above include estimates of non-fee grazing costs (e.g. herding, checking, moving). These estimates were made by Van Tassell and Richardson (1998) using rancher producer panel data and grazing cost data reported by Van Tassell et al. (1997).

[c]/Animal numbers reported are from the published cost-and-return publications for each state. Optimal animal numbers in the LP model will vary by year as beef prices vary. Animal costs exclude the cost of feed stuffs and non-fee grazing costs which are separate activities in the LP model. Animal costs include expenses for other classes of animals like bulls and horses as well.

[d]/Other production parameters used to develop the LP models are defined in the cost-and-return series publications.

Table 3. Seasonal availability (*) of hay and forage for representative ranches.

	Season					
Idaho	1-Mar 15-Apr	15-Apr 15-May	15-May 15-Oct	15-Oct 15-Nov	15-Nov 15-Dec	15-Dec 1-Mar
State trust land		*	*			
BLM		*	*			
Private lease	*	*	*	*	*	
Deeded range	*	*	*	*	*	
Aftermath grazing				*	*	
Convert meadow to pasture	*	*	*	*	*	
Feed raised/purchased hay	*	*				*

	Season					
Nevada	8-Apr 8-May	8-May 8-Jun	8-Jun 1-Oct	1-Oct 23-Nov	23-Nov 15-Dec	15-Dec 8-Apr
BLM	*	*	*			
Private lease	*	*	*	*	*	*
Deeded range	*	*	*	*		
Aftermath grazing				*	*	
Convert meadow to pasture	*	*	*	*	*	
Feed raised/purchased hay	*	*			*	*

	Season					
Oregon	1-Mar 1-Apr	1-Apr 1-May	1-May 1-Oct	1-Oct 1-Nov	1-Nov 1-Dec	1-Dec 1-Mar
BLM	*	*	*	*		
USFS			*			
Private lease	*	*	*	*	*	
Deeded range	*				*	
Aftermath grazing					*	
Convert meadow to pasture		*	*	*	*	
Feed raised/purchased hay	*	*			*	*

Table 4. Productivity measures for harvested and grazed forages.

	Unit	Idaho	Nevada	Oregon
Hay conversion to AUMs	AUMs/ton	2.42	2.42	2.42
Raised native hay	tons/acre	1.5	1.5	1.5
aftermath	AUM/acre	2.3	2.5	2.3
Raised alfalfa hay	tons/acre			4.5
aftermath	AUM/acre			0.3
Pasture native hayland	AUMs/acre	5.5	5.0	

representative ranches. These rates were defined in the cost-and-return publications for each state.

3.3. Linear Programming Analysis

Optimal production and economic returns for the representative ranches was simulated over a 40-year planning horizon with 100 different iterations (beef price situations). The ranch starts the process in year 1 with an inventory of breeding animals (Table 2). From this point, during years 2 through 40, the model is free to adjust herd size (purchase or sell) to profit-maximizing levels subject to forage and cash limitations. Forage and pasture resources can be grazed or not grazed depending on its potential contribution to profit. An exception to this was state trust land in Idaho. Because the Idaho Department of Lands requires fees be paid whether the land is grazed or not, the restriction was included that state land AUMs had to be used.

3.3.1. Output Prices

Annual ranch income and optimal production strategies are greatly influenced by crop and livestock prices. To minimize the effect of beef prices on the results of the policy assessment, a Monte Carlo analysis was used (Hillier and Leiberman 1986). Real (constant 1997) livestock prices were stochastic exogenous variables in the LP analysis. Monthly average livestock prices were used from markets in each of the three study states for the period January 1, 1980 to August 24, 2000 (Unpublished data supplied by David Weaber, Cattle-Fax, Inc., Centennial, Colo., Sept. 8, 2000) to estimate a time series price-forecasting model. The beef price model considers and estimates an approximate 12-year cycle of beef prices. It considers the relative price spread between different classes of livestock and the interdependence of beef prices for different animal classes at any point in time.

The starting point of the beef price cycle was randomly assigned for each iteration. Running the model with numerous alternative beef price scenarios and reporting averages and standard deviations across all iterations minimizes the effect of beef prices in the policy impact assessment.

The cost of purchasing bulls was not reported in the Cattle-Fax data. Data from the Tucumcari, N.M. bull sale was used to estimate that the sale price of bulls (constant 1997) is about twice that of bred cow prices.[1]

Hay prices were not varied by iteration because a long-term data series was not available to estimate annual price variability and relationships. The assumed real purchase and sale price of hay (Table 2) was considered to be the same during each year of the analysis. Another limitation was that annual fluctuations in forage production were not considered. While the importance of variability in annual forage production and the need to adjust stocking rates downward when production is low is widely recognized (Vallentine 1990), it is rarely considered in economic studies because of data limitations. We followed the standard analysis procedure of assuming an average annual level of forage production from each alternative forage source.

Initial debt obligations were not considered as an expense category in the analysis. This is because cost-and-return data used to define typical production practices, production rates, and costs and returns of the representative ranches do not include information about "typical" debt obligations of area ranchers. This personal data is generally not available and is known to vary widely from ranch to ranch. Gentner and Tanaka (2002) reported relatively low average debt loads for different classifications of public land ranchers responding to a West-wide survey.

The amount of off-ranch income and wealth available to ranch families is also variable. Recent studies have found new ranch buyers are not the traditional ranch family that depends exclusively on the ranch for disposable income (Gentner and Tanaka 2002, Torell et al. 2001). People with wealth or great outside income are purchasing many western ranches. As an overall weighted average, Gentner and Tanaka (2002) found large, full-time ranchers to have about $10,000 in annual off-ranch, retirement, and/or investment income. Small, part-time ranchers had $47,000 in off-ranch and other income, and depended on the ranch for less than 20% of annual disposable income. By comparison, full-time ranchers depended on the ranch for about 80% of disposable income (Gentner and Tanaka 2002).

While debt loads, wealth and off-ranch income are highly variable between ranches, the commitment of western ranchers to remain on the ranch remains constant (Gentner and Tanaka 2002, Torell et al. 2001). Given this commitment and the variability in financial resources across ranches, we followed two modeling procedures. First, we did not include investment opportunities like land development or the stock market. The LP model maximizes net discounted returns given the economic opportunity of raising cows or selling hay. Second, we assumed that the representative ranch would have at their disposal average levels of off-ranch income near that found by Gentner and Tanaka (2002). We assumed the 333 AUY ranch in Jordan Valley, had $30,000 in off-ranch income and the larger Nevada and Oregon models had $10,000 in off-ranch income. We assumed no initial wealth other than the initial inventory value of breeding animals and the ranch capital investment. For the base run and impact assessment, there were no debt obligations against the cow herd or the land. Given the known variability in debt across ranches, we then conducted a sensitivity analysis to investigate how the base run and policy impacts would change with increasing debt obligations and/or reduced levels of off-ranch income. We computed the average annual debt payment that could be sustained before and after the land-use policy change. The cash flow constraints of the LP model are of key importance for this assessment in that they require all variable, fixed and family living expenses to be covered each year, given calculated

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[1] The regression equation estimated was Bull Price = 154 + 2.0549_Bred Cow Price, R^2 = 73%. [Annual average prices 1975 – 2001].

annual ranch returns and alternative assumptions about off-ranch income.

Annual borrowing was allowed (10% annual interest rate) with the full amount repaid the following year. The model allows repeated borrowing from year to year across a 40-year planning horizon, but debt must be repaid at the end of that period. Incurring an annual land payment or intermediate loan payment is equivalent to having an additional fixed expense obligation. If fixed expense obligations are too high, the cash flow constraint cannot be met and an "infeasible solution" is obtained. This is how the sensitivity analysis was conducted. The assumed level of off-ranch income was repeatedly reduced and even made negative (implying a borrowing situation) to investigate how decreasing levels of off-ranch income and increasing levels of debt added to the frequency by which annual cash flow requirements would become limiting. This was done for both the base run and the policy impact runs.

The sensitivity analysis presents a best-case situation because the model assumes that all excess funds in good years are saved to meet future cash shortfalls. With this definition the ranch family does not squander money during the good years; they live within the $24,000 family living allowance. Other fixed obligations of the ranch including depreciation and replacement of vehicles, equipment and improvements; electricity; telephone; and insurance are also subtracted as an annual fixed expense (Table 2).

4. Results

4.1. BLM Grazing Reductions

4.1.1. Jordan Valley, Idaho Model

Table 5 presents the average and standard deviation [computed over 100 beef price situations (iterations) and 40 years] of key production, and economic and resource variables estimated to be optimal (profit-maximizing) for the Jordan Valley, Idaho model under different levels of BLM AUM availability. For the current situation, given the defined seasonal forage resources of the representative ranch, approximately 22% of BLM AUMs would optimally go unused each year because cash and forage resources in other seasons are more limiting. An average 345 AUY would be maintained on the ranch. Annual net cash income[1] was estimated to be $8,856 with a great deal of variability (standard deviation of $21,820). Given an assumed annual input of $30,000 from off-ranch sources, this means the ranch was subsidized by off-ranch employment by about $21,000/year. Approximately 35% of the time net annual income (including ranch and off-ranch sources) would be negative, requiring transfer of savings from previous years or borrowing to meet cash flow requirements. These periods of negative income occurred in low beef price years or when herd expansion was economically optimal.

With off-ranch income and assumed frugal behavior and saving, the Jordan Valley model was always able to find a feasible solution, i.e., cash flow requirements could always be met. Only a minimal amount of annual borrowing was required with current allowed uses of federal forage.

As BLM grazing was sequentially reduced, net annual ranch returns decreased. The reduction in net ranch income per BLM AUM removed ranged from $2.41/AUM with a 50% BLM reduction to $3.44/AUM when BLM grazing was precluded. Average annual net cash income decreased from $8,856/year under the current situation to $1,631/year with a 100% BLM grazing reduction. This is the average residual amount that remains as a return on total ranch investment once all variable costs, loan costs, fixed costs and family living expenses have been paid.

Because the representative ranch did not depend on BLM land for 100% of annual grazing capacity, the optimal reduction in herd size was far less in percentage terms than the percent reduction in BLM forage. A 50% BLM reduction, for example, reduced optimal average herd size by 19% and a 100% BLM reduction reduced optimal average herd size by 42% (Table 5). This reduction is very near the average 39% that the representative ranch depended on BLM for annual grazing capacity under the current allotment allocation.

In addition to herd size reductions, other optimal adjustments to reduced BLM AUMs included conversion of hay land to pasture. Over 100 acres of hay land would optimally be used as pasture if the total BLM allotment were removed (Table 5). At an assumed cost of $13.25/AUM, private leased forage would only be the least-cost forage substitute when beef prices were relatively high and minimum number of private leased AUMs would optimally be used.

4.1.1.1. Sensitivity Analysis

It was assumed that the representative Jordan Valley model ranch had at its disposal an annual $30,000 in off-ranch income. The utmost level of

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[1] /Net cash income was defined to be gross crop and livestock sales + off-ranch income – variable production expenses – annual loan costs – fixed ranch expenses - family living expenses. It is the residual return to the investment in land and cattle, and to risk.

frugality was assumed with all excess funds in the good years saved to meet shortfalls in future years. With this frugal savings plan, a minimal level of annual borrowing was required.

Figure 2 shows how the likelihood of going broke (i.e. incurring an infeasible solution) increased with decreasing amounts of off-ranch income and for alternative reductions in available BLM AUMs. As shown, access to about $25,000 in outside annual income is crucial. With the current allocation of BLM AUMs, the Jordan Valley ranch would be unable to meet cash flow requirements in 5 out of 100 iterations (beef price situations) when off-ranch income was reduced to the $25,000 level. These infeasible solutions occurred when relatively low beef prices were realized in the early years of the analysis.

As off-ranch income was reduced to $20,000/year and below, cash flow restrictions became limiting in all cases. The $15,000 range in off-ranch income (from $30,000 to $15,000) between being able to always meet annual ranch and family expenses and the 100% probability of going broke is extremely narrow. There is no ability to service

Table 5. Optimal adjustments to reductions in BLM AUMs, Jordan Valley, Idaho model.

	Percent reduction in BLM AUMs			
Adjustments in optimal use levels	0%	50%	75%	100%
BLM available (AUMs)	2,098	1,049	525	0
Optimal average BLM used (AUMs)	1,632 (223)	1,040 (35)	523 (14)	0 (0)
Percent of AUMs from BLM land	39%	31%	18%	0%
Average number of brood cows (head)	223 (18)	180 (22)	154 (28)	127 (34)
Average number of AUY	345 (31)	280 (33)	239 (41)	199 (50)
Percent reduction in AUY (%)	–	-19%	-31%	-42%
Average annual variable production costs ($)	71,231 (7,569)	59,246 (6,718)	49,268 (8,156)	39,646 (11,083)
Average annual variable production costs ($/AUY)	206	212	206	199
Average annual net cash income ($)	8,856 (21,820)	6,331 (17,624)	4,223 (15,472)	1,631 (14,814)
Average annual net cash income ($/AUY)	25.67	22.61	17.67	8.20
Average change in net cash income ($/BLM AUM removed)	–	-2.41	-2.94	-3.44
Deeded Range (AUMs)	240 (0)	240 (0)	240 (0)	240 (47)
State trust land (AUMs)	144 (0)	144 (0)	144 (0)	144 (0)
Private Lease (AUMs)	1 (9)	35 (91)	38 (100)	38 (100)
Meadow hayland acres hayed/grazed (acres)	325 (0)	313 (10)	265 (14)	214 (14)
Meadow acres converted to pasture (acres)	0 (0)	12 (10)	60 (14)	111 (14)
Raised meadow hay fed (tons)	440 (35)	359 (42)	307 (54)	256 (65)
Raised meadow hay sold (tons)	47 (35)	113 (44)	100 (46)	82 (44)
Purchased alfalfa hay fed (tons)	123 (34)	98 (26)	83 (24)	68 (22)
Average amount borrowed annually ($)	83 (1,234)	66 (1,118)	57 (1,012)	457 (5,222)
Probability of being forced out of business (%)	0%	0%	0%	0%
Probability of negative net annual cash income (%)	35%	37%	40%	45%

[a]/Number in parenthesis is the standard deviation measured over the 100 iterations and 40 years.

[b]/The assumption was made that the reduction in allowed grazing capacity would be incrementally phased in over 5 years. Thus, the computed average is for years 6 through 40 after the reduction is fully implemented.

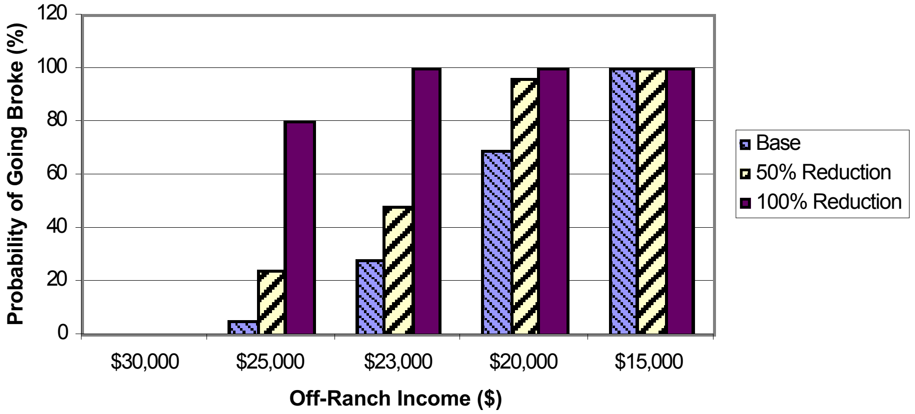

Figure 2. Probability of not being able to meet cash flow requirements with alternative levels of off-ranch income and with BLM allotment reductions, Jordan Valley, Idaho model.

long-term or intermediate debt from net ranch income for this 300-AUY ranch. This representative ranch must be subsidized by off-ranch income or accumulated wealth if the assumed fixed costs and family living allowance is to be paid each year.

The percentage of time that the representative ranch went broke increased as increasing levels of BLM forage was removed. Removal of the BLM permit would cause an 80% probability of going broke when off-ranch income was reduced from $30,000, to $25,000 (Fig. 2).

As shown by Gentner and Tanaka (2002), many public land ranchers have annual off-ranch income and wealth far in excess of what was assumed here. Others have less. Whether ranchers will remain in business as federal AUMs are removed will depend on their willingness to incur reduced ranch income, and their commitment to the ranching lifestyle. The cash flow restriction does not limit production opportunities for ranchers subsidizing the ranch enterprise with large amounts of off-ranch income and wealth, but it was a limiting factor for the defined representative ranch.

4.1.2. Northeastern Nevada Model

Table 6 presents results for the Northeastern Nevada model under different levels of BLM AUM availability. About 7% of available BLM AUMs would optimally go unused with the current AUM allocation. An average 728 AUY would be produced on the ranch. Annual net cash income was estimated to be $30,794 ($42.30/AUY) with the current BLM allotment. Given an assumed annual input of $10,000 from off-ranch sources, this means the representative northeastern Nevada ranch returned an average net annual profit from livestock and crop production of about $20,800/year (i.e., return to investment and risk). Approximately 25% of the time, net annual income would be negative.

As BLM AUMs were reduced by 50%, 75% and 100%, a nearly constant reduction in net returns per AUM was estimated, $5.77/AUM, $6.03/AUM and $6.16/AUM, respectively (Table 6). Annual net cash income decreased from $30,794/year under the current situation to $5,259/year (83% reduction) with a 100% BLM grazing reduction. This means the ranch would move from a positive average profit of $20,800/year to an average loss of $4,741/year with removal of the BLM permit. Annual net cash income was estimated to be positive because of the assumed off-ranch income. With a 100% BLM reduction, 44% of the time, annual net cash income would be negative. In addition to herd size reductions, other optimal adjustments to reduced BLM AUMs included conversion of hay land to pasture (Table 6). Private leased land was not profitable to graze at the assumed $30/AUM cost for the Nevada model (Table 2).

4.1.2.1. Sensitivity Analysis

A negative level of off-ranch income is equivalent to including an annual loan payment or cash outlay. Sensitivity analysis indicates the representative Northeastern Nevada model, given the current allocation of BLM grazing capacity, could incur an additional $10,000 fixed annual

Table 6. Optimal adjustments to reductions in BLM AUMs, Northeastern Nevada model.

	Percent reduction in BLM AUMs			
Adjustments in optimal use levels	0%	50%	75%	100%
BLM available (AUMs)	4,148	2,074	1,037	0
Optimal average BLM used (AUMs)	3,847 (276)[a]	2,074 (0)	1,037 (0)	0 (0)
Percent of AUMs from BLM land	44%	31%	18%	0%
Average number of brood cows (head)	419 (27)	321 (41)	272 (51)	223 (62)
Average number of AUY	728 (39)	556 (52)	472 (68)	389 (87)
Percent reduction in AUY (%)	–	-24%	-35%	-47%
Average annual variable production costs ($)	127,341 (6,705)	96,010 (6,804)	78,045 (9,995)	60,076 (13,567)
Average annual variable production costs ($/AUY)	175	173	165	154
Average annual net cash income ($)	30,794 (40,254)	18,836 (31,620)	12,028 (28,477)	5,259 (26,140)
Average annual net cash income ($/AUY)	42.30	33.88	25.48	13.52
Average change in net cash income ($/BLM AUM removed)	–	-5.77	-6.03	-6.16
Deeded Range (AUMs)	115 (0)	115 (0)	115 (0)	115 (0)
Private Lease (AUMs)	0 (0)	0 (0)	0 (0)	0 (0)
Meadow hayland acres hayed/grazed (acres)	778 (31)	651 (45)	542 (38)	432 (31)
Meadow acres converted to pasture (acres)	22 (31)	149 (45)	258 (38)	368 (30)
Raised meadow hay fed (tons)	934 (50)	610 (91)	610 (91)	503 (114)
Raised meadow hay sold (tons)	221 (98)	271 (98)	226 (85)	181 (71)
Purchased alfalfa hay fed (tons)	170 (25)	106 (16)	106 (16)	79 (19)
Purchased meadow hay fed (tons)	2 (18)	1 (17)	1 (16)	0 (14)
Average amount borrowed annually ($)	6 (382)	7 (323)	5 (269)	4 (248)
Probability of being forced out of business (%)	0	0	0	0
Probability of negative net annual cash income (%)	25%	30%	36%	44%

[a]/Number in parenthesis is the standard deviation measured over the 100 iterations and 40 years..

[b]/The assumption was made that the reduction in allowed grazing capacity would be incrementally phased in over 5 years. Thus, the computed average is for years 6 through 40 after the reduction is fully implemented.

payment and still cover production expenses, fixed costs and the family living allowance. With this $10,000 annual payment, the model would fail to meet cash flow requirements only 2% of the time (Fig. 3). This payment could service an approximate $100,000, 30-year loan to purchase the ranch, or a revolving $35,000 5-year loan (assuming a 9% interest rate). The likelihood of going broke quickly increases as additional $5,000 increments of annual loan obligation are added. Further, the ability of the representative Northeastern Nevada ranch to incur added debt is quickly removed as BLM AUMs are removed (Fig. 3). The average optimal size of the ranch moves from 728 AUY with the current BLM allotment allocation to 389 AUY when the permit was removed (Table 6), and this reduced ranch size is no longer able to generate the income needed to cover loan payments.

4.1.3. Lake County, Oregon Model

Table 7 presents results for the Lake County, Oregon model under different levels of BLM AUM availability. All available BLM AUMs would be used each year with the current allotment allocation and resource combination. About 2% of available USFS AUMs would optimally go unused in the baseline situation. An average of 723 AUY would optimally be produced on the ranch. Over half (57%) of the grazing capacity of the ranch would come from BLM and USFS grazing allotments.

Annual average net cash income was estimated to be $50,059/year ($69.24/AUY) with current BLM and USFS allotments. Approximately 16% of the time, net annual income would be negative.

The economic impact of sequentially reducing the availability of BLM AUMs ranged from about $10/BLM AUM removed for 50% and 75% BLM allotment reductions to $11.77/AUM with total elimination of BLM grazing. Annual net cash income was reduced to $21,808/year (56% reduction) with a 100% BLM reduction (Table 7).

With a 100% reduction in BLM grazing, the optimal use of USFS AUMs would be reduced by about 11%. Some of the BLM AUMs were replaced by leasing increasing amounts of private forage (Table 7), but the primary way the profit-maximizing model adjusted to AUM reductions was to reduce herd size. The average number of livestock produced was reduced from 723 AUY with the current allotment allocation to 485 AUY (33% reduction) with elimination of the BLM permit (Table 7). The representative Lake County, Oregon model is defined to have substantial hay land resources and optimally switches to hay selling when the size of the BLM allotment is reduced.

4.1.3.1. Sensitivity Analysis

With the current BLM and USFS allotment allocation, the representative Lake County, Oregon model could sustain a $40,000 annual debt payment (Fig. 4). Similar to the other two ranch models, removing BLM AUMs reduced the optimal scale (herd size) and profitability of the ranch. The ability to service debt was increasingly reduced with increasing reductions in BLM grazing capacity.

4.2. Eliminating Spring Grazing

4.2.1. Jordan Valley, Idaho Model

The representative Jordan Valley Ranch under current policy turns out on BLM and state lands on April 15. Table 8 presents the optimal seasonal grazing use when the turn-out date is moved to May 15. In this analysis, the only possible or allowed grazing alternative was to extend winter feeding through the April 15 – May 15 period. Herd size

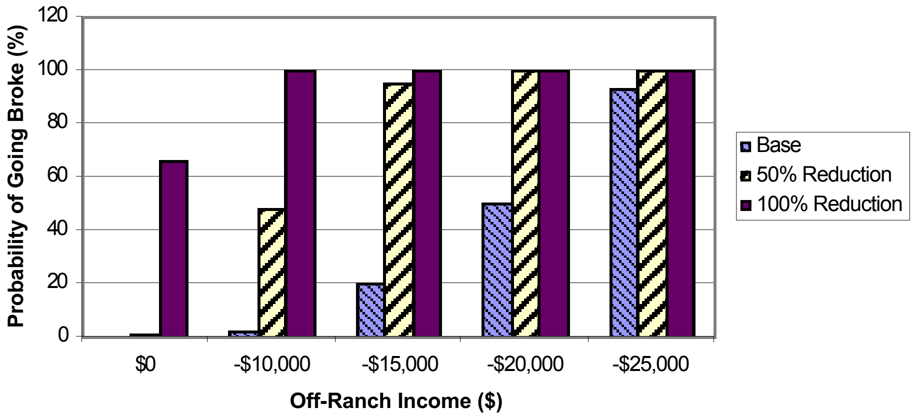

Figure 3. Probability of not being able to meet cash flow requirements with alternative levels of annual debt payment and with BLM allotment reductions, Northeastern Nevada model.

Table 7. Optimal adjustments to reductions in BLM AUMs, Lake County, Oregon model.

	Percent reduction in BLM AUMs			
Adjustments in optimal use levels	0%	50%	75%	100%
BLM available (AUMs)	2,400	1,200	600	0
Optimal average BLM used (AUMs)	2,400 (0)[a]	1,200 (0)	1,200 (0)	0 (0)
Optimal average USFS used (AUMs)	2,513 (132)	2,540 (78)	2,533 (76)	2,269 (150)
Percent of AUMs from BLM and USFS lands	57%	51%	56%	39%
Average number of brood cows (head)	416 (17)	350 (26)	318 (31)	278 (41)
Average number of AUY	723 (37)	607 (37)	552 (42)	485 (58)
Percent reduction in AUY (%)	–	-16.0%	-23.7%	-32.9%
Average annual variable production costs ($)	140,703 (10,999)	122,757 (9,298)	115,635 (8,027)	109,411 (8,529)
Average annual variable production costs ($/AUY)	195	202	209	226
Average annual net cash income ($)	50,059 (49,542)	37,972 (40,818)	31,456 (38,066)	21,808 (35,256)
Average annual net cash income ($/AUY)	69.24	62.56	56.99	44.96
Average change in net cash income ($/BLM AUM removed)	–	-10.07	-10.34	-11.77
Deeded Range (AUMs)	113 (0)	113 (0)	113 (0)	113 (0)
Private Lease (AUMs)	249 (208)	296 (198)	376 (139)	492 (24)
Meadow hayland acres hayed/grazed (acres)	290 (0)	290 (0)	290 (0)	290 (1)
Raised Alfalfa hay fed (tons)	341 (45)	182 (44)	253 (35)	221 (39)
Raised meadow hay fed (tons)	435 (0)	543 (75)	425 (13)	402 (37)
Raised meadow hay sold (tons)	0 (0)	0 (1)	10 (13)	33 (36)
Raised alfalfa hay sold (tons)	64 (45)	123 (38)	152 (35)	184 (39)
Purchased alfalfa hay fed (tons)	0 (0)	0 (0)	0 (0)	0 (0)
Purchased meadow hay fed (tons)	135 (26)	1 (10)	16 (35)	21 (40)
Average amount borrowed annually ($)	0 (0)	0 (0)	0 (0)	2 (117)
Probability of being forced out of business (%)	0	0	0	0
Probability of negative net annual cash income (%)	16%	18%	21%	27%

[a]/Number in parenthesis is the standard deviation measured over the 100 iterations and 40 years..

[b]/The assumption was made that the reduction in allowed grazing capacity would be incrementally phased in over 5 years. Thus, the computed average is for years 6 through 40 after the reduction is fully implemented.

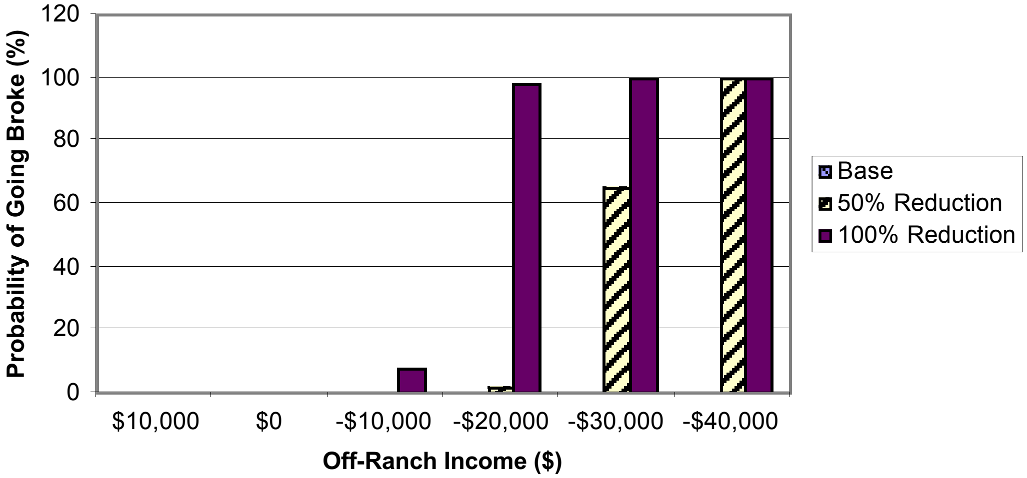

Figure 4. Probability of not being able to meet cash flow requirements with alternative levels of annual debt payment and with BLM allotment reductions, Lake County, Oregon model.

could also be altered if that was most profitable.

With these two available options, the profit-maximizing adjustment would be to reduce average herd size from 345 AUY to 274 AUY. An estimated 75 tons (182 AUMs) of hay would be required to replace the loss of AUMs of grazing capacity previously harvested from BLM land (Table 8). With the reduced herd size, 18 tons of additional hay would be sold.

The average 248 AUMs previously grazed during the April 15 – May 15 on BLM land was not removed from potential grazing; only the season of use was restricted in the analysis, but, eliminating spring grazing reduced optimal average BLM AUM use to 972 AUMs. This was a 683 AUM reduction relative to the base run. Spring grazing now limits annual production, and AUMs supplied in other seasons are not economically useful; thus, elimination of spring grazing became economically equivalent to an allotment reduction.

Average net economic returns decreased by $5,994 with the elimination of spring grazing (Table 8). When divided by the 248 AUMs previously grazed on BLM land during the spring period (Table

Table 8. Optimal adjustments to elimination of spring grazing on BLM land, Jordan Valley, Idaho model.

Season			BLM	State	Deeded	Meadow hayland grazed/ hayed	Raised meadow hay fed	Purchased alfalfa hay	Total
Adjustments in seasonal forage use									
Base run with BLM spring grazing (AUMs)									
2-Mar	to	16-Apr	0	0	0	0	433	51	485
16-Apr	to	16-May	248	0	40	0	0	34	322
16-May	to	16-Oct	1,407	144	97	0	0	0	1,648
16-Oct	to	16-Nov	0	0	100	377	0	0	477
16-Nov	to	16-Dec	0	0	3	369	0	0	373
16-Dec	to	2-Mar	0	0	0	0	632	213	845
TOTAL USED (AUM)			1,655	144	240	747	1,066	298	4,150
No BLM spring grazing (AUMs)									
2-Mar	to	16-Apr	0	0	0	0	343	41	384
16-Apr	to	16-May	0	0	40	0	189	27	256
16-May	to	16-Oct	972	144	188	0	0	0	1,304
16-Oct	to	16-Nov	0	0	12	453	0	0	464
16-Nov	to	16-Dec	0	0	0	294	0	0	295
16-Dec	to	2-Mar	0	0	0	0	490	179	669
TOTAL USED (AUM)			972	144	240	747	1,022	247	3,372

Adjustments in:	Base Run with BLM spring grazing	Without BLM Spring Grazing	Change
Average number of AUY	345	274	-71
	(31)	(53)	
Average number of brood cows	223	175	-48
	(18)	(34)	
Average annual net cash income ($)	8,856	2,862	-5,994
	(21,820)	(17,235)	
Average annual net cash income ($/AUY)	25.67	10.44	-15.22
Average change in net cash income ($/BLM AUM removed during the spring period)			-24.17
Raised meadow hay sold (tons)	47	65	18
Average amount borrowed annually ($)	83	493	410
Probability of being forced out of business (%)	0%	2%	
Probability of negative net annual cash income (%)	35%	45%	

8), the loss in net returns is $24.17/AUM removed.

The economic impact of removing spring grazing will depend on what alternative forages are considered to be available. Thus, as a second analysis, spring grazing on BLM land was removed, but in this case it was assumed the ranch could freely adjust the seasonal use of all deeded AUMs. Hay land could be converted to pasture and grazed in the spring, and private leased land could be leased during the spring. With these forage alternatives (table not shown), the economic impact of removing spring grazing on BLM land was much less ($5.34/AUM removed from spring grazing). The optimal adjustment would be to graze nearly all deeded AUMs in the spring and lease a small amount of private AUMs. Optimal herd size would be reduced to 311 AUY. Optimal BLM AUM use would decrease to 1,342 AUMs.

The flexibility to have alternative forage sources is likely not possible for many of the Jordan Valley ranches, but the analysis clearly shows the potential to minimize the economic impact of removing spring grazing if other grazing resources can be substituted.

4.2.2. Northeastern Nevada Model

The representative Northeastern Nevada ranch under current policy turns out on BLM land on April 8. Table 9 presents the optimal seasonal grazing adjustments when the turn-out date is moved to May 8. In this analysis, the only possible or allowed grazing alternative was to extend winter feeding through the April 8 – May 8 period. Herd size could also be altered.

With elimination of BLM spring grazing, hay sales would be reduced from 221 tons to 120 tons.

An estimated 222 tons (538 AUMs) of hay would be required to replace the loss of AUMs of grazing capacity previously harvested from BLM land during the spring (Table 9). Average herd size would also be reduced from 728 AUY to 589 AUY.

Eliminating spring grazing reduced optimal average BLM AUM use to 2,187 AUMs. This was a 1,684 AUM reduction (44% reduction) from the base run. A major shift in the seasonal use of forage would optimally occur. BLM AUMs supplied in other seasons could not economically be used because of the forage shortages in the spring.

Net economic returns decreased by $17,171 with elimination of spring grazing (Table 9). When divided by the 665 AUMs previously grazed on BLM land during the spring period, the loss in net returns was $25.82/AUM removed from spring grazing. If more seasonal flexibility of other forages was assumed, the estimated loss would still be relatively high, $18.76/BLM AUM removed in the spring. In this second analysis, additional hay land would optimally be converted to pasture and deeded AUMs would be allocated for spring grazing (table not shown). Hay feeding would not increase. Similar to the Jordan Valley, Idaho model, grazing alternatives are cheaper then hay feeding if those alternatives exist.

4.2.3. Lake County, Oregon

The representative Lake County, Oregon ranch under current policy turns out relatively early on BLM land (March 1). Table 10 presents the optimal adjustments when this turn-out date is moved to April 1. Alternative sources of spring forage considered only the feeding of hay. Herd size could be altered if that would be more profitable. With these two allowed adjustments, the optimal strategy would be to extend the winter hay feeding period by a month. The 285 BLM AUMS removed during March would optimally be used later in the grazing

Table 9. Optimal adjustments to elimination of spring grazing on BLM land, Northeast Nevada model.

Season	BLM	Deeded	Hayland converted to pasture	Meadow hayland grazed/ hayed	Raised meadow hay fed	Purchased meadow hay	Purchased alfalfa hay	Total
Adjustments in seasonal forage use								
Base run with BLM land spring grazing (AUMs)								
9-Apr to 9-May	665	0	0	0	0	0	0	665
9-May to 9-Jun	688	0	0	0	0	0	0	688
9-Jun to 2-Oct	2,518	29	4	0	0	0	0	2,551
2-Oct to 24-Nov	0	86	125	1,435	0	0	0	1,646
24-Nov to 16-Dec	0	0	15	490	0	0	67	572
16-Dec to 9-Apr	0	0	0	0	2,260	5	346	2,612
TOTAL USED (AUM)	3,871	115	144	1,925	2,260	5	413	8,734
No BLM land spring grazing (AUMs)								
9-Apr to 9-May	0	0	0	0	525	13	0	538
9-May to 9-Jun	536	3	17	0	0	0	0	556
9-Jun to 2-Oct	1,651	100	312	0	0	0	0	2,063
2-Oct to 24-Nov	0	12	19	1,371	0	0	0	1,401
24-Nov to 16-Dec	0	0	2	394	0	0	53	449
16-Dec to 9-Apr	0	0	0	0	1,834	8	273	2,116
TOTAL USED (AUM)	2,187	115	349	1,765	2,360	21	326	7,123

Adjustments in:	Base Run with BLM spring grazing	Without BLM Spring Grazing	Change
Average number of AUY	728	589	-139
	(39)	(55)	
Average number of brood cows	419	341	-78
	(27)	(41)	
Average annual net cash income ($)	30,795	13,624	-17,171
Average annual net cash income ($/AUY)	42.30	23.13	-19.17
Average change in net cash income ($/BLM AUM removed during the spring period)			-25.82
Raised meadow hay sold (tons)	221	120	-101
Average amount borrowed annually ($)	7	92	85
Probability of negative net annual cash income (%)	25%	37%	

[1]/Number in parenthesis is the standard deviation computed over the 100 iterations and 40 years.

season, allowing herd size to increase by 19 head.

This result of using the BLM forage during a later season and increasing herd size is different from the results for the Nevada and Idaho models, but similar to the findings of Torell et al. (1981). The Oregon model is defined to have substantial hay resources, yet the assumed production cost of the hay ($/ton) is nearly equivalent to the sale price (Table 2). By comparison, the profit margin is defined to be $22/ton for the Idaho and Nevada models. Further, developing marginal hay meadows for grazing was not considered to be a viable option for the Oregon model whereas these activities were included for the Idaho and Nevada models. For the Oregon model, limited alternatives for hay land were included and the opportunity cost of feeding the hay to cows was relatively low. This likely explains the difference in the optimal adjustment strategy when spring BLM AUMs were removed.

The economic consequences of eliminating spring BLM grazing was to reduce net income by $8.17/BLM AUM removed from grazing during March. The total loss of net income for the ranch was $5,607.

If an expanded number of leased private AUMs are allowed to be grazed during the March period (table not shown), the economic consequences of removing spring grazing on BLM is minimal. Under the current situation, the ranch optimally leases an average of 250 AUMs of private leased forage. Most of that is leased May 1 to October 1 (Table 10). If the ranch has the flexibility to alter when those private AUMs are leased, the cost-minimizing adjustment would obviously be to move them to March and graze BLM later in the summer. By doing this, the model suffered no economic losses from the season-of-use adjustment. Economic returns and herd size remained unchanged; just the seasonal use pattern of forage was changed.

5. Summary and Conclusions

Public land is an important seasonal source of forage for western ranches. Thus, eliminating BLM grazing to improve habitat for sage-grouse would

Table 10. Optimal adjustments to elimination of spring grazing on BLM land, Lake County, Oregon model.

Season	BLM	USFS	Deeded	Leased private forage	Meadow hayland grazed/ hayed	Raised meadow hay fed	Purchased meadow hay	Purchased alfalfalfa hay	Raised alfalfalfa hay	Total
Adjustments in seasonal forage use										
Base run with BLM land spring grazing (AUMs)										
2-Mar to 2-Apr	285	0	266	0	0	0	0	0	160	711
2-Apr to 2-May	686	0	0	0	0	0	0	0	0	686
2-May to 2-Oct	763	2,496	0	243	0	0	0	0	0	3,502
2-Oct to 2-Nov	666	0	0	2	284	0	0	0	0	952
2-Nov to 2-Dec	0	0	334	5	383	0	0	0	0	722
2-Dec to 2-Mar	0	0	0	0	0	1,053	327	1	666	2,046
TOTAL USED (AUM)	2,400	2,496	600	250	667	1,053	327	1	825	8,619
No BLM land spring grazing (AUMs)										
2-Mar to 2-Apr	0	0	266	0	0	155	140	2	165	728
2-Apr to 2-May	705	0	0	0	0	0	0	0	0	705
2-May to 2-Oct	977	2,445	0	173	0	0	0	0	0	3,595
2-Oct to 2-Nov	718	0	0	0	0	0	0	0	0	718
2-Nov to 2-Dec	0	0	334	2	892	0	0	0	0	1,228
2-Dec to 2-Mar	0	0	0	0	0	922	513	5	687	2,127
TOTAL USED (AUM)	2,400	2,445	600	175	892	1,077	653	7	852	9,101

Adjustments in:	Base Run With BLM Spring Grazing	Without BLM Spring Grazing	Change
Average number of AUY	723 (37)	742 (44)	19
Average number of brood cows	416 (17)	425 (19)	9
Average annual net cash income ($)	50,059	44,452	-5,607
Average annual net cash income ($/AUY)	69.24	59.91	-9.33
Average change in net cash income ($/BLM AUM removed during the spring period)			-8.17
Raised alfalfa hay sold (tons)	64	53	-11
Raised meadow hay sold (tons)	0	0	0
Average amount borrowed annually ($)	0	0	0
Probability of negative net annual cash income (%)	16%	19%	

have a significant impact on the economic viability of affected ranches. This is especially true during the spring period. Early spring grazing is valuable because few alternative forage sources are available at that time. In most cases, the only feasible forage alternative would be to feed hay.

Rowe and Bartlett (2001, p. 64) concluded that once hay was needed to compensate for public forage losses, reducing herd size would be the most cost-effective adjustment. Our results generally support this conclusion. Making alterative grazing resources available during the spring always minimized losses relative to feeding hay or reducing herd size. If complete flexibility of other deeded forages were assumed, the economic loss of restricting the early use of BLM lands was minimal; seasonal use of alternative forages would be rearranged with little if any economic consequence.

The economic value of the BLM forage during the spring period was found to be 5 to 10 times the value in other seasons later in the year for both the Idaho and Nevada models. In this case, the elimination of spring grazing was equivalent to a grazing reduction because the BLM forage would not be used at a later date for profit maximization. This was not the case for the Oregon model with the major difference being the assumed hay resources. The Lake County, Oregon model was defined to have substantial hay land resources that made feeding hay a feasible alternative for the spring period. BLM AUMs would optimally be used in a later season allowing an increase in the average optimal herd size.

The economic impacts from reducing BLM grazing in any season were found to vary widely depending on several key factors. First, individual ranches will be able to substitute alternative forages to varying degrees as federal AUMs are eliminated. Substituting forages minimizes economic losses relative to the option of feeding hay and reducing cow herd size. Those ranches with restricted seasons of forage availability will have less ability to substitute alternative forages if BLM grazing is removed.

Annual average economic losses from removing AUMs ranged from about $3/AUM for the Jordan Valley, Idaho model, $6/AUM for the Northeastern Nevada model, to about $10/AUM for the Lake County, Oregon model. This is a wide range in annual value, but other similar studies in the literature report even a wider value range (Hahn et al. 1989). The contributory value of the federal grazing permits for livestock production varies widely depending on the seasonal complement of forage and pasture resources ranches have, and the level of dependency on federal lands.

Seasonal forage limitations, the degree to which public land forages meet seasonal forage demands, and the availability of substitute forages largely determined the economic value of the federal grazing permit. It is widely believed that the complement between public and private lands contributes greatly to the economics of western ranching and our analysis clearly shows that to be the case. Economic losses estimated here from reducing or changing seasons of grazing use on public lands are annual values. Capitalizing these annual values at any reasonable rate suggests a significant "permit value" and contribution from holding the federal grazing permit.

Western ranches vary greatly in financial resources (Gentner and Tanaka 2002). For those ranches with limited off-ranch wealth and income, reducing public land grazing capacity by even marginal amounts was found to greatly impact the ability of ranchers to meet annual financial obligations and to repay debt. We provided an estimate of what percentage of the time the representative ranches would be unable to meet the cash flow requirements assumed in the model when grazing policies were changed. Yet, in reality, how many ranchers will potentially be forced from the business as policies change cannot be determined because debt loads and off-ranch income are highly variable and unknown. The level of commitment to remain on the ranch is also variable and unknown.

Ranch-level impact estimates of how ranch returns would change if public land grazing levels and allowed seasons of use change are generic. The assessment and impact estimates apply to any situation where public land grazing are reduced or spring grazing is eliminated. As related specifically to sage-grouse, eliminating public land AUMs or removing grazing during the spring are options that have been discussed (Clifford 2002). Hopefully less drastic management options can be adopted. "The Gunnison Sage-Grouse Working Group recognizes the need to be opportunistic and carry out specific conservation actions as situations present themselves", as an example (USDI-BLM 2001, p. 7). What this analysis shows is that, if less drastic management options cannot be found and grazing use on public lands is curtailed or allowed seasons of use altered in the name of protecting the sage-grouse, the economic impact to western public land ranchers will be significant.

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How the Census Bureau Measures Poverty

Following the Office of Management and Budget's (OMB) Statistical Policy Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps).

Income Used to Compute Poverty Status (Money Income)

- Includes earnings, unemployment compensation, workers' compensation, Social Security, Supplemental Security Income, public assistance, veterans' payments, survivor benefits, pension or retirement income, interest, dividends, rents, royalties, income from estates, trusts, educational assistance, alimony, child support, assistance from outside the household, and other miscellaneous sources.
- Noncash benefits (such as food stamps and housing subsidies) **do not** count.
- Before taxes
- Excludes capital gains or losses.
- If a person lives with a family, add up the income of all family members. (Non-relatives, such as housemates, do not count.)

Measure of Need (Poverty Thresholds)

Poverty thresholds are the dollar amounts used to determine poverty status.
Each person or family is assigned one out of 48 possible poverty thresholds [XLS - 48k]
Thresholds vary according to:

- Size of the family
- Ages of the members

The same thresholds are used throughout the United States (do not vary geographically).
Updated annually for inflation using the Consumer Price Index for All Urban Consumers (CPI-U).
Although the thresholds in some sense reflect families needs,

- They are intended for use as a statistical yardstick, not as a complete description of what people and families need to live.
- Many government aid programs use a different poverty measure, the Department of Health and Human Services (HHS) poverty guidelines , or multiples thereof.

Poverty thresholds were originally derived in 1963-1964, using:

- U.S. Department of Agriculture food budgets designed for families under economic stress.
- Data about what portion of their income families spent on food.

Computation

If total family income is less than the threshold appropriate for that family,

- The family is in poverty.
- All family members have the same poverty status.
- For individuals who do not live with family members, their own income is compared with the appropriate threshold.

If total family income equals or is greater than the threshold, the family (or unrelated individual) is not in poverty.

Example
Family A has five members: two children, their mother, father, and great-aunt.
Their threshold was $27,517 in 2011. (See poverty thresholds for 2011). [XLS - 48k]
Suppose the members' incomes in 2011 were:

Mother	$10,000
Father	8,000
Great-aunt	10,000
First Child	0
Second Child	0
Total Family Income	**$28,000**

Compare total family income with their family's threshold:
Income / Threshold = $28,000 / $27,517 = 1.02
Since their income was greater than their threshold, Family A is not "in poverty" according to the official definition.
The income divided by the threshold is called the **Ratio of Income to Poverty**.

-- Family A's ratio of income to poverty was 1.02.

The difference in dollars between family income and the family's poverty threshold is called the **Income Deficit** (for families in poverty) or **Income Surplus** (for families above poverty)

-- Family A’s income surplus was $483 (or $28,000 - $27,517).

People Whose Poverty Status Cannot Be Determined
Unrelated individuals under age 15 (such as foster children):

- Income questions are asked of people age 15 and older.
- If someone is under age 15 and not living with a family member, we do not know their income.
- Since we cannot determine their poverty status, they are excluded from the "poverty universe" (table totals).

People in:

- Institutional group quarters (such as prisons or nursing homes)
- College dormitories
- Military barracks
- Living situations without conventional housing (and who are not in shelters)

Authority Behind Official Poverty Measure
The official measure of poverty was established by the Office of Management and Budget (OMB) in Statistical Policy Directive 14
To be used by federal agencies in their statistical work.
Government aid programs do not have to use the official poverty measure as eligibility criteria.

- Many government aid programs use a different poverty measure, the Department of Health and Human Services (HHS) poverty guidelines , or variants thereof.
- Each aid program may define eligibility differently.

Official poverty data come from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC), formerly called the Annual Demographic Supplement or simply the "March Supplement."

How Poverty is Calculated in the American Community Survey [PDF - 11k]

History

The Development of the Orshansky Thresholds and Their Subsequent History as the Official U.S. Poverty Measure , by Gordon M. Fisher

Source: U.S. Census Bureau | Social, Economic, and Housing Statistics Division: Poverty | Last Revised: October 26, 2012

From: Miller, Chris J -FS [chrismiller@fs.fed.us]
Sent: Wednesday, March 18, 2015 10:53 AM
To: Uriarte, Alex; jsuhrpierce@blm.gov
Subject: Alt comparison tables
Attachments: Comparison of Allocations_2105223 NWCO.docx; Comparison of Allocations_2105223_IDswMT.DOCX; NV Comparison of Allocations 022315.docx; Overview of major changes between Draft EIS and Proposed Plan.docx; Utah Comparison of Allocations_2_27_2015.docx

Alex, Julie,

Attached are tables comparing the preferred to the proposed alternative for each of the subregions – for the BLM (FS should not change much) – that you probably already have. Madelyn and some others in FS may be relying on these to ground truth their effects analyses – to make sure no substantial differences in effects are being missed. Seems they could also ground truth socio-econ effects?

Also – there's a more detailed table for NWCO subregion that is handy – wish we had these for all subregions.

Again – this may be duplicative material for you.

Chris

NW Colorado Comparison of Draft and Final EIS Allocations

Resource		Alternative D (DEIS Preferred Alternative)	Proposed Plan
Lands			
Major ROWs	PHMA	Exclusion[1]	Avoidance
	GHMA	Open	Avoidance
Minor ROWs	PHMA	Avoidance	Avoidance
	GHMA	Open	Avoidance
Utility Corridors (existing)	PHMA	None	None
	GHMA	None	None
Utility Corridors (New)	PHMA	None	None
	GHMA	None	None
Land Tenure	PHMA	Retain	Retain
	GHMA	None	None
Solar	PHMA	Avoidance	Exclusion
	GHMA	Open	Avoidance
Wind	PHMA	Avoidance	Exclusion
	GHMA	Open	Avoidance
Minerals			
Fluid Minerals			
Oil and Gas	SFA	N/A	N/A
	PHMA/GHMA	No similar action.	No leasing within 1 mile of active leks
	PHMA	NSO (Major Constraints– with WEMs)	NSO (Major Constraints– with strict WEMs)
	GHMA	Open with moderate constraints (CSU/TL) Within 0.6 miles of active leks – NSO (with WEMs)	Open with Moderate Constraints (CSU/TL) Within 2 miles of active leks - NSO (with strict WEMs)
Geothermal[i]	SFA	N/A	N/A
	PHMA	NSO (Major Constraints– with WEMs)	NSO (Major Constraints– with strict WEMs)
	GHMA	Open with moderate constraints (CSU/TL) Within 0.6 miles of active leks – NSO (with WEMs)	Open with Moderate Constraints (CSU/TL) Within 2 miles of active leks - NSO (with strict WEMs)
Locatable	SFA	N/A	N/A
	PHMA	Open	Open
	GHMA	Open	Open
Saleable	PHMA	Open, subject to disturbance cap	Closed
	GHMA	Open	Open
Non-energy	PHMA	Open, subject to disturbance cap	Closed within 1 mile of active leks Within 2 miles of active leks – NSO (with strict WEMs) Remainder of PHMA – NSO (with strict WEMs)

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[1] Manage 68,000 acres as avoidance areas for large transmission lines.

	GHMA	Open	Closed within 1 mile of active leks Within 2 miles of active leks – NSO (with strict WEMs)
Livestock	SFA	N/A	N/A
	PHMA	Available	Available
	GHMA	Available	Available
Roads	PHMA	Limited	Limited
	GHMA	Limited	Limited
Wild Horse and Burro	PHMA	Manage to AML	Manage to AML
	GHMA	Manage to AML	Manage to AML

Idaho sw Montana Comparison
of Draft and Final EIS
Allocations

Resource and Habitat Identifier				Alternative D (DEIS Preferred Alternative)	Alternative E (DEIS Preferred Alternative)	Proposed Plan
Lands	**Alt. D**	**Alt. E**	**Proposed Plan**			
Major ROWs	PPMA	CHZ	PHMA	Exclusion	Avoidance	Avoidance
	PMMA	IHZ	IHMA	Avoidance	Avoidance	Avoid Screening Process
	PGMA	GHZ	GHMA	Avoidance	Open	Open
Minor ROWs	PPMA	CHZ	PHMA	Avoidance	Avoidance	Avoidance
	PMMA	IHZ	IHMA	Avoidance	Avoidance	Avoidance
	PGMA	GHZ	GHMA	Avoidance	Open	Open
Utility Corridors (existing)	PPMA	CHZ	PHMA	Open	Open	Open
	PMMA	IHZ	IHMA	Open	Open	Open
	PGMA	GHZ	GHMA	Open	Open	Open
Utility Corridors (New)	PPMA	CHZ	PHMA	NA	NA	Existing Open
	PMMA	IHZ	IHMA	NA	NA	Existing Open
	PGMA	GHZ	GHMA	NA	NA	Existing Open
Land Tenure	PPMA	CHZ	PHMA	Retention	NA	Retention
	PMMA	IHZ	IHMA	Retention	NA	Retention
	PGMA	GHZ	GHMA	Retention	NA	Exchange Only
Solar	PPMA	CHZ	PHMA	Exclusion		Exclusion
	PMMA	IHZ	IHMA	Avoidance		Avoidance
	PGMA	GHZ	GHMA	Open		Open
Wind	PPMA	CHZ	PHMA	Exclusion		Exclusion
	PMMA	IHZ	IHMA	Avoidance		Avoidance
	PGMA	GHZ	GHMA	Open		Open
Minerals						
Fluid Minerals						

Idaho sw Montana Comparison of Draft and Final EIS Allocations

Resource and Habitat Identifier				Alternative D (DEIS Preferred Alternative)	Alternative E (DEIS Preferred Alternative)	Proposed Plan
Oil and Gas	NA	NA	SFA	NA	NA	NSO no exception
	PPMA	CHZ	PHMA	Open	Open	NSO
	PMMA	IHZ	IHMA	Open	Open	NSO
	PGMA	GHZ	GHMA	Open	Open	Open
Geothermal[i]	NA	NA	SFA	NA	NA	NSO no exceptions
	PPMA	CHZ	PHMA	Open	Open	NSO
	PMMA	IHZ	IHMA	Open	Open	NSO
	PGMA	GHZ	GHMA	Open	Open	Open
Locatable	NA	NA	SFA	NA	NA	Proposed Withdrawal
	PPMA	CHZ	PHMA	Open	Open	Open
	PMMA	IHZ	IHMA	Open	Open	Open
	PGMA	GHZ	GHMA	Open	Open	Open
Saleable	PPMA	CHZ	PHMA	Closed to new	Open	Closed
	PMMA	IHZ	IHMA	Closed to new	Open	Open
	PGMA	GHZ	GHMA	Open	Open	Open
Non-energy	PPMA	CHZ	PHMA	Closed	Open	Closed
	PMMA	IHZ	IHMA	Closed	Open	Open
	PGMA	GHZ	GHMA	Open	Open	Open
Livestock	NA	NA	SFA	NA	NA	Prioritized permit renewal
	PPMA	CHZ	PHMA	Available	Available	Available
	PMMA	IHZ	IHMA	Available	Available	Available
	PGMA	GHZ	GHMA	Available	Available	Available
Roads	PPMA	CHZ	PHMA	Limited	Limited	Limited
	PMMA	IHZ	IHMA	Limited	Limited	Limited
	PGMA	GHZ	GHMA	Limited	Limited	Limited
Wild Horse and Burro	PPMA	CHZ	PHMA	Available	NA	Prioritized permit renewal
	PMMA	IHZ	IHMA	Available	NA	Available
	PGMA	GHZ	GHMA	Available	NA	Available

NV Comparison of Draft and Final EIS Allocations

Resource		Alternative D (DEIS Preferred Alternative)	Proposed Plan
Lands			
Major ROWs	PHMA	Avoidance	**Avoidance**
	GHMA	Avoidance	**Avoidance**
Minor ROWs	PHMA	Avoidance	**Avoidance**
	GHMA	Avoidance	**Open**
Utility Corridors (existing)	PHMA	Open	**Open**
	GHMA	Open	**Open**
Utility Corridors (New)	PHMA	Excluded	**Excluded**
	GHMA	Excluded	**Excluded**
Land Tenure	PHMA	Retain	**Retain**
	GHMA	Retain	**Retain**
Solar	PHMA	Exclusion	**Exclusion**
	GHMA	Exclusion	**Exclusion**
Wind	PHMA	Exclusion	**Exclusion**
	GHMA	Exclusion	**Avoidance**
Minerals			
Fluid Minerals			
Oil and Gas	SFA	N/A	**NSO-Major Constraints, no WEMs**
	PHMA	NSO-Major Constraints w/WEMs	**NSO-Major Constraints, w/ WEMs**
	GHMA	NSO-Major Constraints w/WEMs	**Open with Moderate Constraints (CSU/TL)**
Geothermal[i]	SFA	N/A	**NSO-Major Constraints, no WEMs**
	PHMA	NSO-Major Constraints w/ WEMs	**NSO-Major Constraints w/WEMs**
	GHMA	NSO-Major Constraints w/ WEMs	**Open with Moderate Constraints (CSU/TL)**
Locatable	SFA	N/A	**Recommended Withdrawal**
	PHMA	Open	**Open**
	GHMA	Open	**Open**
Saleable	PHMA	Closed	**Closed**
	GHMA	Closed	**Open**
Non-energy	PHMA	Closed	**Closed**
	GHMA	Closed	**Open**
Livestock	SFA	N/A	**Priority for Permit Renewal**
	PHMA	Available	**Available**
	GHMA	Available	**Available**
Roads	PHMA	Limited	**Limited**
	GHMA	Limited	**Limited**
Wild Horse and Burro	PHMA	Manage to AML	**Manage to AML**
	GHMA	Manage to AML	Manage to AML

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[i] BLM CA has the exception language similar Oil and Gas. BLM NV has slightly different language in exception.

Overview of major changes between Draft EIS and Proposed Plan
NWCO GrSG Proposed Plan
March 17th, 2015

	Draft EIS (NOA August 16, 2013) Preferred Alternative	Proposed Plan (target NOA May 29, 2015)
Disturbance Cap	5% cap in PHMA in ecological sites that support sagebrush – calculated by CO Management Zone	3% cap in PHMA calculated by CO Management Zone
Unleased Fluid Minerals	Apply NSO stipulation for fluid mineral leasing in PHMA. Apply NSO stipulation for fluid mineral leasing in ADH within a minimum distance of 0.6-mile from active leks. Within ADH, prohibit surface occupancy within a minimum of 4 miles from active leks during lekking, nesting, and early brood rearing. Surface disturbance within ecological sites that support sagebrush in PHMAs would not exceed 5 percent within the corresponding Colorado MZ.	No new leasing 1 mile from active leks in ADH (Blickley, 2012, Harju, 2012, Patricelli 2012). No surface occupancy in PHMA and within 2 miles of active leks in GHMA. 3% disturbance cap in PHMAs with disturbances limited to 1 per 640 density calculated by CO Management Zone would apply to new lease activities. No new leasing in PHMAs if disturbance cap exceeds 3% for the CO Management Zone or 1 per 640 is exceeded. No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood rearing (March 1-July 15). Authorized Officer could grant an exception, modification, or waiver in consultation with the State of Colorado. Any lands leased in PHMAs are subject to the restrictions of 1 disturbance per 640 acres calculated by CO management zone to allow clustered development
Leased Fluid Minerals	Prohibit surface occupancy or disturbance within 4 miles of a lek during lekking, nesting, and early brood rearing. Limit permitted disturbances to 5 percent in any Colorado MZ.	Within 1 mile of active leks, disturbance, disruptive activities and occupancy are precluded. If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 per 640, and/or 3% disturbance cap, use the criteria below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in **Appendix X** (Mitigation).

	Draft EIS (NOA August 16, 2013) Preferred Alternative	Proposed Plan (target NOA May 29, 2015)
		In PHMAs and within 4 miles of an active lek, the criteria below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to sage-grouse. Based on site-specific conditions, prohibit construction, drilling and completion within PHMAs within 4 miles of a lek during lekking, nesting, and early brood rearing (March 1 through July 15). In consultation with the State of Colorado, this timing limitation may be adjusted based on application of the criteria below (paraphrased here). - Location - Evaluation of threats vs. benefits - Evaluation of specific terrain and habitat features To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.
Lands and Realty	(PHMA) Make GRSG PHMAs avoidance areas for new ROW permits. (PHMA) Make PHMAs exclusion areas for large transmission lines (greater than 230 kilovolts, per guidance in BLM Instruction Memorandum 2013-118, Revised Implementation Guidance for the Interagency Transmission Memorandum of Understanding (BLM 2013b). Manage 68,000 acres as avoidance areas for large transmission lines (greater than 230 kilovolts). Any new projects within PHMAs would be subject to the 5 percent disturbance cap.	(PHMA) Make areas within GRSG PHMAs avoidance areas for BLM ROW permits or USFS SUA permits. (GHMA) Make areas within GRSG GHMAs avoidance areas for BLM ROW permits or USFS SUA permits. No new roads or above-ground structures would be authorized within 1 mile of an active lek. Manage PHMAs and GHMAs as avoidance areas for high voltage (greater than 100 kilovolts) transmission lines, except for the transmission projects specifically identified below. All authorizations in these areas must comply with the conservation measures outlined in this Proposed LUPA, including RDFs/PDFs (**Appendix X**) and avoidance criteria as outlined above. TransWest Express and Energy Gateway South Transmission Lines: The proposed projects, including mitigation measures, would be subject to the standards outlined in the

	Draft EIS (NOA August 16, 2013) Preferred Alternative	Proposed Plan (target NOA May 29, 2015)
		mitigation framework (Section XX) to ensure impacts to GRSG and GRSG habitat have been adequately addressed. **<still waiting for WO approval to use this language>** Any new projects within PHMAs would be subject to the 3 percent disturbance cap.
Wind Energy	No similar action.	(PHMA) Make priority GRSG habitat management areas exclusion areas for wind energy development. (GHMA) Make GHMAs avoidance areas for wind energy development.
Industrial Solar	No similar action.	(PHMA) Make priority GRSG habitat management areas exclusion areas for Industrial Solar projects. (GHMA) Make GHMAs avoidance areas for Industrial Solar projects.
Salable Minerals	(PHMA) Consider allowing existing mineral material sale sites to continue operations. Consider allowing expansion of existing mineral material sales sites. Where practicable, limit permitted disturbances, as defined in **Appendix F**, Disturbance Cap Management, to 5 percent in any Colorado MZ. Where disturbance exceeds 5 percent in any Colorado MZ make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.	(PHMA) Close PHMAs to new mineral material sales. However, these areas would remain open to free use permits and the expansion of existing active pits, only if the following criteria are met: • The activity is within the Biologically Significant Unit (BSU) and the project area disturbance cap; • The activity is subject to the provisions set forth in the mitigation framework (**Appendix X**); • All applicable required/preferred design features are applied; and, [if applicable] the activity is permissible under the regional screening criteria (**Section XX**).
Nonenergy Leasable Minerals	(PHMA) Consider allowing expansion of existing nonenergy mineral leases. Where practicable, limit permitted disturbances, as defined in **Appendix F**, Disturbance Cap Management, to 5 percent in any Colorado MZ. Where disturbance exceeds 5 percent in any Colorado MZ make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.	<u>New non-energy mineral leases:</u> No new non-energy mineral leasing in PHMAs. <u>Existing non-energy mineral leases:</u> Apply the following conservation measures as COAs where applicable and feasible: Preclude new surface occupancy on existing leases within 1 mile of active leks. (Blickley, 2012, Harju, 2012, Patricelli 2012).

	Draft EIS (NOA August 16, 2013) Preferred Alternative	Proposed Plan (target NOA May 29, 2015)
		If the lease is entirely within 1 mile of an active lek, require any development to be placed in the area of the lease least harmful to sage-grouse based on vegetation, topography, or other habitat features (See **Appendix E**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). Preclude new surface disturbance on existing leases within 2 miles of active leks within PHMAs. If the lease is entirely within 2 miles of an active lek, require any development to be placed in the area of the lease least harmful to sage-grouse based on vegetation, topography, or other habitat features (See **Appendix E**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). Limit permitted disturbances to 1 per 640 acres average across the landscape in PHMAs. Disturbances may not exceed 3% in PHMAs in any CO Management Zone. Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMAs within 4 miles of a lek during lekking, nesting, and early brood rearing (March 1 through July 15).

Oregon Comparison of Draft and Final EIS Allocations

Resource		**Alternative D (DEIS Preferred Alternative)**	**Proposed Plan**
Lands			
Major ROWs	PHMA	Above-ground linear: Exclusion w/in 4 miles of occupied leks. Avoidance outside of 4-miles. Pipelines: Avoidance	**Avoidance**
	GHMA	All ROWs: Avoidance within 1 mile of occupied leks. Open outside of 1-mile.	**No new allocation (Open)**
Minor ROWs	PHMA	Above-ground linear (e.g., distribution lines): Exclusion w/in 4 miles of occupied leks. Avoidance outside of 4-miles. Above-Ground Site-Type: Exclusion within 1 mile of occupied leks. Avoidance outside 1-mile. Pipelines: Avoidance	**Avoidance**
	GHMA	All ROWs: Avoidance within 1 mile of occupied leks. Open outside of 1-mile.	**No new allocation (Open)**
Utility Corridors (existing designated)	PHMA	Undesignated corridors with no existing ROWs. Remaining corridors remain open for ROWs.	**Undesignated some corridors. Remaining corridors remain open for ROWs.**
	GHMA	Open for ROWs	**Open for ROWs**
Utility Corridors (New)	PHMA	Designated some new corridors to concentrate infrastructure development. These would be open for ROWs	**Did not designate any new corridors.**
	GHMA	Designated some new corridors to concentrate infrastructure development. These would be open for ROWs	**Did not designate any new corridors.**
Land Tenure	PHMA	Retain	**Retain**
	GHMA	No management specified	**Retain**
Solar	SFA	N/A	**Exclusion**
	PHMA	Exclusion (from PEIS, no new decision)	**Exclusion**
	GHMA	Exclusion (from PEIS, no new decision)	**Exclusion**
Wind	SFA	N/A	**Exclusion**
	PHMA	Exclusion	**Exclusion**
	GHMA	Exclusion within 1-mile of occupied leks; open outside 1-mile.	**No new allocation (Open)**
Minerals			
Fluid Minerals			
Oil and Gas	SFA	N/A	**NSO-Major Constraints, no WEMs**
	PHMA	NSO-Major Constraints w/WEMs w/in 4-miles of occupied leks. CSU/TL outside 4-mile lek buffer.	**NSO-Major Constraints, w/ WEMs**
	GHMA	NSO-Major Constraints w/WEMs w/in 1-mile of occupied leks. CSU/TL outside 1-mile lek buffer.	**No new allocation (Open)**
Geothermal	SFA	Same as oil and gas	Same as oil and gas
	PHMA	Same as oil and gas	Same as oil and gas
	GHMA	Same as oil and gas	Same as oil and gas
Locatable	SFA	N/A	**Recommended Withdrawal**
	PHMA	Open	**Open**
	GHMA	Open	**Open**

Saleable	PHMA	Closed w/in 1-mile of occupied leks. Closed to commercial outside 1-mile buffer. Open to other types of saleable development outside 1-mile lek buffer.	**Closed…but free use and expansion**
	GHMA	Closed w/in 1-mile of occupied leks. Open outside 1-mile lek buffer.	**No new allocation (Open)**
Non-energy	PHMA	Closed to surface mining methods.	**Closed…but expansion**
	GHMA	No surface disturbance within 1-mile of an occupied lek.	**No new allocation (Open)**
Livestock	SFA	N/A	**Priority for Permit Renewal**
	PHMA	Available	**Available**
	GHMA	Available	**Available**
Roads	PHMA	Limited	**Limited**
	GHMA	Limited	**Limited**
Wild Horse and Burro	PHMA	Manage to AML	**Manage to AML**
	GHMA	Manage to AML	**Manage to AML**

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Friday, June 27, 2014 1:13 PM
To: Uriarte, Alex
CC: Kurz, Elizabeth; ICF_SGSE
Subject: BLM SGSE - annual O&G production for MT, ND, SD plans
Attachments: MT oil gas production RMP data 062714.xlsx

Hey Alex,

Attached is production information. The "revised" data are what you want. The notes are helpful. Let me know if you have questions.

I'm close to getting the 9-plan data. Did you get data for the other Wyoming plans?

Josh

--
Josh Sidon, Ph.D.
Economist, National Operations Center
Bureau of Land Management
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Annual average O&G production for MT, ND, SD plans

	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	140,058	140,058	127,515	127,515
annual gas production (MCF)	21,408,854	21,408,854	7,103,972	7,103,972
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

Source of revised numbers: Production by alternative included in updated RFD pro

Theme Conservation

	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	478,000	5,955,000	34,164	5,824,737
annual gas production (MCF)	795,000	7,962,105	57,000	7,816,842
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

Source of revised numbers: Production estimated as total # of active BLM wells (e

Theme (GRSG in all alternatives) Conservation

	Billings			
	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	~~429,628~~	~~429,628~~	~~322,140~~	~~322,140~~
annual gas production (MCF)	~~221,418~~	~~221,418~~	~~166,022~~	~~166,022~~
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

Source of revised numbers: per Ruth Miller RFD for fluid minerals is not changing

	South Dak			
	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	239,856	418,709	191,374	340,997
annual gas production (MCF)	280,514	3,876,915	223,814	3,157,360
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

GRSG in all alternatives; D is preferred

Source of revised numbers: Obtained from Russ pigors on 6/25 - pulled from upda

	North Dakota Greater Sa

	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	58,430	58,430	25,138	25,138
annual gas production (MCF)	8,933	8,933	3,843	3,843
cbng production (have # of wells)				

Note: production focused on new wells in priority, general and connectivity habitats
Revised numbers- per Ruth Miller, no changes to the production/well numbers--stays the sa

	Lewistown Sage-Grouse Amendment: email from Ad			
NOT APPLICABE-SEE NOTE	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)				
annual gas production (MCF)				
cbng production (have # of wells)				

Note: Email from Henry indicating that oil/gas production not included because production/

Hi Line RMP					
Alt C		Alt D		Alt E	
Draft	Revised	Draft	Revised	Draft	Revised
137,044	137,044	140,264	140,264	138,891	138,891
18,278,203	18,278,203	21,639,476	21,639,476	20,097,721	20,141,212

›vided by Barney Whiteman

Balance		Development (no GRSG)		Preferred = proposed	

Miles City RMP					
Alt C		Alt D		Alt E	
Draft	Revised	Draft	Revised	Draft	Revised
426,000	5,962,895	434,000	5,968,421	307,000	5,924,211
709,000	7,972,632	722,000	7,975,789	512,000	7,928,421

xisting + avg annual new) from RFD * 15,000 bbls per well annually or 20,000 M(

Balance		Development		Preferred	

RMP			
Alt C		Alt D	
Draft	Revised	Draft	Revised
~~429,628~~	~~429,628~~	~~427,882~~	~~427,882~~
~~221,418~~	~~221,418~~	~~220,518~~	~~220,518~~

GRGS will not affect O&G

ota RMP			
Alt C		Alt D	
Draft	Revised	Draft	Revised
188,823	247,457	191,374	266,760
220,830	2,291,257	223,814	2,469,983

ted SD RFD

ge-Grouse Amendment

Alt C		Alt D	
Draft	Revised	Draft	Revised
24,706	24,706	49,891	49,891
3,777	3,777	7,629	7,629

me

lam Carr June 4 stating that they are finalizing chpt 2 and will then send us the

Alt C		Alt D		Alt E	
Draft	Revised	Draft	Revised	Draft	Revised

development is not anticipated.

CF per well annually

Cumulative (2011-2030)

	A	B	C	D
New CBNG Wells - Dry	2	1	2	2
New Gas Wells - Dry				
New Oil Wells - Dry				
CBNG Wells - Producing	21	10	18	21
New Gas Wells - Producing	1,513	480	1,292	1,529
New Oil Wells - Producing	30	24	29	30
CBNG Production	-	-	-	-
Gas Production	428,177,081	142,079,447	365,564,054	432,789,526
Oil Production	2,801,160	2,550,300	2,740,871	2,805,289

Source: **O&G:** Appendix E Updated Tables 1.16-1.21 **CBNG wells: Appendix E Updated Tables 1.22-1.27**

* Since there is no history of CBNG production near the planning area, no attempt was made to try to project rat wells produce relatively low volumes of gas at other productive locations in the Rocky Mountains, so we do nc production from any CBNG wells found to be productiv

Annual Average 2011- 2030

	Existing (Avg 2011-2014)	A	B	C
New CBNG Wells - Dry		0.11	0.05	0.11
New Gas Wells - Dry				
New Oil Wells - Dry				
CBNG Wells - Producing				
New Gas Wells - Producing		75.6	24.0	64.6
New Oil Wells - Producing		1.5	1.2	1.5
CBNG		-	-	-
Gas Production	16,956,257	21,408,854	7,103,972	18,278,203
Oil Production	103,353	140,058	127,515	137,044

E	
2	
	**Still waiting on data*
16	
1,427	
30	
-	
402,824,243	
2,777,829	

es of gas production for this type of development. CBNG
t project that there would be a significant increase in gas
e.

D	E
0.11	0.11
76.4	71.4
1.5	1.5
-	-
21,639,476	20,141,212
140,264	138,891

MCFO Cumulative 2011- 2030

Wells	A	B	C	D	E
CBNG - Existing	179	179	179	179	179
Gas Wells - Existing	378	378	378	378	378
Oil Wells -Existing	373	373	373	373	373
CBNG - New Producing	499	337	504	513	486
Gas Wells - New Producing	382	244	392	395	350
Oil Wells - New Producing	456	291	466	473	417
New Dry CBNG	21	15	21	21	20
New Dry Gas Wells	102	64	103	106	92
New Dry Oil Wells	129	82	132	133	118

Source: **RFD Shor-Term & Long-Term Disturbance Tables**

Annual Average 2011-2030

Wells	Existing	A	B	C	D
New CBNG Wells- Producing		26.26	17.74	26.53	27.00
New Gas Wells - Producing		20.11	12.84	20.63	20.79
New Oil Wells - Producing		24.00	15.32	24.53	24.89
New Dry CBNG Wells		1.11	0.79	1.11	1.11
New Dry Gas Wells		5.37	3.37	5.42	5.58
New Dry Oil Wells		6.79	4.32	6.95	7.00
CBNG - Production		-	-	-	-
Gas - Production	7,560,000	7,962,105	7,816,842	7,972,632	7,975,789
Oil -Production	5,595,000	5,955,000	5,824,737	5,962,895	5,968,421

	A	B	C	D	E
BLM Acres Available for Leasing	4,526,81	3,045,746	4,526,81	4,526,81	4,526,81

15,000	bbls per well per year*
20,000	mcf per well per year*
	* provided by PE

E
25.58
18.42
21.95
1.05
4.84
6.21
-
7,928,421
5,924,211

SDRFD 2010-2029

Wells	A	B	C	D
CBNG - New Producing	3.6	2.6	1.3	2.1
Oil & Gas Wells - New Produci	84.6	68.9	50	53.9
New Dry CBNG	0.4	0.3	0.1	0.2
New Dry Oil & Gas Wells	9.40	7.60	5.50	6.00

Annual Average 2010 - 2029

Wells	A	B	C	D
CBNG - New Producing	0.18	0.13	0.07	0.11
Oil & Gas Wells - New Produci	4.23	3.45	2.50	2.70
New Dry CBNG	0.02	0.02	0.00	0.01
New Dry Oil & Gas Wells	0.47	0.38	0.28	0.30
Gas - Production	3,876,915.16	3,157,359.71	2,291,256.86	2,469,982.65
Oil -Production	418,709	340,997	247,457	266,760

** Coalbed gas production was not assessed. If any coalbed gas production does come online during the 20-year pl*
the total gas production between 2010 and 2029.

'anning period, it would only be a minor part of

From: Uriarte, Alex [Alex.Uriarte@icfi.com]
Sent: Friday, February 13, 2015 6:29 AM
To: Sidon, Joshua B (jsidon@blm.gov); Julie Suhr Pierce (jsuhrpierce@blm.gov); Stewart Allen; Miller, Chris J -FS (chrismiller@fs.fed.us)
CC: Fetter, Rob; ICF_SGSE; Johnson, Laura
Subject: BLM SGSE - grazing input on proposed plans
Attachments: Grazing Data Request for ID MT.docx; Grazing Data Request for NV CA.docx; Grazing Data Request for NWCO.docx; Grazing Data Request for OR.docx; Grazing Data Request for UT.docx

Josh, Julie, Stewart, Chris,

In preparation for the socioeconomic analysis of impacts of the proposed plan for the GRSG RMP/EISs, we prepared the attached requests for input from BLM and USFS grazing specialists on the impacts of the proposed plans on grazing. The requests ask for the number of open and closed AUMs under the proposed plans, relative to current management. We understand grazing specialists might still not have information about the proposed plans to answer and we may still have other questions for the grazing specialists, after we see the proposed plans ourselves. We are sharing now because the input requests contain information on the sources of data used so far (something Josh and Chris were asking for) and because it will give you a chance to provide any input on the requests themselves ahead of time, if you wish to do so. I shared a few of these earlier this week with Chris, who was asking for them. The input requests assume there will be no revisions in the data provided for the alternatives already analyzed (i.e. no change in habitat boundaries). If there are changes in the habitat boundaries from previous analysis, we may need to modify these a bit.

If you have any comments on the content or format of these requests please do let me know. We are preparing requests for input from other resource areas as well.

(Note: please keep Laura Johnson copied on future emails: she will be helping me manage our work load during this final stretch)

Thanks,

Alex

ALEX URIARTE | Technical Specialist | 703.218.2587 | alex.uriarte@icfi.com | icfi.com
ICF INTERNATIONAL | 9300 Lee Highway, Fairfax, VA 22031 | 703.934.3000
Connect with us on social media.

Data Request – Impacts of Management Alternatives on Grazing – Idaho/Montana:

To:

BLM: Julie Suhr Pierce, Dominika Lepak

USFS: Chris Miller, Dustin Bambrough

Table R-1 below shows active and billed AUMs by FO and NS used in the draft EIS.

Table R-1
Current and Historical Annual Animal Unit Months Data

	Active AUMs[1]	Active AUMs in ADH[2]	Billed as Share of Active[3]
Bruneau Field Office	109,567	98,528	78%
Burley Field Office	123,505	76,765	72%
Challis Field Office	53,570	39,935	59%
Dillon Field Office	72,637	64,283	75%
Four Rivers Field Office	118,918	43,602	81%
Jarbidge Field Office	178,271	129,014	84%
Owyhee Field Office	125,140	101,029	86%
Pocatello Field Office	68,768	40,876	86%
Salmon Field Office	55,966	37,376	80%
Shoshone Field Office	196,137	182,430	61%
Upper Snake River Field Office	140,084	126,608	67%
Beaverhead-Deerlodge National Forest	154,629	42,832	100%
Boise National Forest	59,319	9,596	100%
Caribou-Targhee National Forest	288,344	59,660	100%
Salmon-Challis National Forest	146,804	54,478	100%
Sawtooth National Forest	155,511	83,244	100%
Socioeconomic Study Area	2,047,170	1,190,255	-

Data Sources:

- BLM data:
    1. Active AUMs and Active AUMs in ADH from data collected by John Courtright on June 03, 2013. The data was uploaded to ICF’s FTP site by Josh Sidon on July 09, 2013. It is a large file (21MB) originally titled *“Active_Allotment_Range_Summary_JohnC.xlsx.”*
    2. Billed AUMs as a share of active AUMs data from comparing active AUMs by FO in 2011 with billed average between 2000 and 2011, as provided to ICF by Josh on August 07, 2012 in the files *“National_20_Years_Bills_2012-8-1”* and *“County_term_uths_allots_AUMs_2012-8-3.”*
- USFS data:
    1. Active (“permitted”) AUMs from data provided by Dustin Bambrough on June 20, 2013, in a file called “*ID_MT_PermittedUse06192013*.”

2. Active ("permitted") AUMs in ADH from data provided by Dustin Bambrough on July 16, 2013 in a file called *"ID_MT_PermittedUseGRSGHabitat06202013REVISED*." Note: Table R-1 shows 187 less Active AUMs in ADH for the Beaverhead-Deerlodge NF than what is shown in the Excel file. This must be due an adjustment per follow-up conversations, possibly the removal of an allotment (e.g. Bivens Creek or Dry Canyon).
3. Billed (authorized) as a share of active (permitted) we agreed to use 100%.

Based on exchanges with Dominika Lepak (BLM) and Dustin Bambrough (USFS) between June 05, 2013 and July 16, 2013, management alternatives were assumed to impact AUMs as follows:

Alternatives A, B, D and E – all AUMs remain open

Alternative C – AUMs in ADH are closed

Alternative F – 25% reduction in active and billed AUMs in ADH (scenario not accounting for the possibility that an initial reduction in AUMs on BLM-administered lands could lead to the loss of additional AUMs due to seasonal limitations in the availability of grazing areas – low scenario. A high scenario was also estimated multiplying the loss in AUMs in the low scenario by an adjustment factor estimated based on Torell et al. 2014. *Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse*, to account for seasonal closures

Please provide the expected reduction in active and billed AUMs in the Proposed Plan relative to current management (Alternative A)

Data Request – Impacts of Management Alternatives on Grazing – Nevada/California:

To:

BLM: Julie Suhr Pierce, Mike Tietmeyer

USFS: Chris Miller, Dustin Bambrough

Table R-1 below shows active AUMs in the study area, by alternative, used in the draft EIS. The data in this table is NOT AUMs in GRSG habitat, but rather in the entire study area. The data is consistent with the following AUMs in GRSG habitat in the study area, as used in Appendix K of the DEIS:

Forest Service	275,248 AUMs
California BLM	172,231 AUMs
Nevada BLM	1,762,997 AUMs

Table R-1
Estimated Active Annual Animal Unit Months by Alternative for the Study Area

Agency	Initial	Alternatives A, B, D, E and G	Alternative C	Alternative F
		Active		
Forest Service	276,191	276,191	943	104,161
California BLM	191,733	191,733	19,502	84,089
Nevada BLM	2,088,722	2,088,722	325,725	986,849
Socioeconomic Study Area	2,556,646	2,556,646	346,170	1,175,098

Data Sources:

- BLM data:
  1. Active AUMs for 2011 by FO and share of Active AUMs billed (based on 2000-2011 average) from RAS query of 07/03/2012.
  2. Active AUMs in GRSG habitat from Appendix K of Draft EIS, provided by Josh Sidon in email of 06/17/2014.
- USFS data:
  1. Active ("permitted") AUMs for the H-T NF sent by Josh Sidon in email of 06/03/2013 based on conversations with Chris Miller and Dustin Bambrough.
  2. Active ("permitted") AUMs in GRSG habitat from Appendix K of Draft EIS, provided by Josh Sidon in email of 06/17/2014
  3. Billed (authorized) as a share of active (permitted) for H-T NF assumed 85%, based on 2000-2011 Avg.

Based on previous information provided by BLM (Mike Tietmeyer) and FS (Dustin Bambrough), management alternatives were assumed to impact AUMs as follows (*where Alternative G is the draft proposed plan*):

Alternatives A, B, D, E, and G – forage availability remains the same as under current management

Alternative C – all AUMs in GRSG habitat closed

Alternative F – 62.5 percent of active AUMs in GRSG habitat closed (25 percent of the area in GRSG habitat must be rested each year. Of the remaining 75 percent, 50 percent must be set aside).

In addition, a high impact scenario was also estimated multiplying the loss in AUMs in the scenario above by an adjustment factor estimated based on Torell et al. 2014. *Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse*). This high impact scenario accounts for additional losses of AUMs due to seasonal closures.

Please provide expected reduction in active AUMs in the revised Proposed Plan, or confirm that the active AUMs remain the same as those under Alternatives A, B, D and E.

Data Request – Impacts of Management Alternatives on Grazing – Idaho/Montana:

To:

BLM: Erin Jones, Josh Sidon

USFS: Chris Miller, Dustin Bambrough

Table M.11 below shows active and billed AUMs in the study area, in and out of ADH. (Note: billed AUMs were edited with respect to the draft EIS to account for historic averages)

Table M.1
Estimated Annual Animal Unit Months

	Alternative A					
	Active			Billed		
Item	Cattle and Other	Sheep	Total	Cattle and Other	Sheep	Total
Initial AUMs (Alternative A)	388,346	88,306	476,652	278,963	60,732	339,695
Share in ADH	70.69%	70.69%	70.69%	70.69%	70.69%	70.69%
AUMs in ADH	274,527	62,424	336,951	197,203	42,932	240,134
AUMs not in ADH (Alternative C)	113,820	25,881	139,701	81,761	17,800	99,561

Data Sources:

- BLM data:
    1. Active and billed AUMs from data provided to ICF by Josh on August 07, 2012 in the files *"National_20_Years_Bills_2012-8-1"* and *"County_term_uths_allots_AUMs_2012-8-3."*
    2. The share of AUMs in ADH was assumed to be 70.69%, based on the ratio of 476,652 total active AUMs in the study area for both BLM and FS, and 336,951 AUMs in ADH in the study area, for both BLM and FS. The number 336,951 came from draft range management ch. 4 sent by Erin Jones on 02/08/2013. (note: this number was in a table but seems to have been removed for the draft EIS. The table is reproduced below):

	Number of Allotments in ADH	**Current permitted AUMS**	**leases/permittees**
Little Snake Field Office	291	141,661	280
Colorado River Valley Field Office	48	12,895	45
Grand Junction Field Office	43	10,919	39
White River Field Office	159	111,516	151
Routt National Forest	26	19,482	23
Kremmling Field Office	236	31,742	224
Roan Plateau Planning Area	15	8,736	18

TOTAL	**818**	**336,951**	**780**

- USFS data:
    1. Active ("permitted") AUMs (73,213) from data provided by Dustin Bambrough and forwarded by Chris Miller on March, 07, 2013, in a file called "*RouttNFPermitted&Authorized*."
    2. Billed (authorized) as a share of active (permitted) assumed 100%
    3. The share of AUMs in ADH was assumed to be 70.69% for both BLM and FS together, as explained above. This included 19,482 AUMs in ADH for the Routt NF (see table above), which is consistent with data provided by Dustin Bambrough and forwarded by Chris Miller on March, 07, 2013, in a file called "*RouttAUMs*."
    4. Note: percentage distribution of AUMs among cattle and sheep are for the Medicine Bow-Routt NF for 2011. This distribution comes from file titled "*miller_request_authorizedAUMs.xls*," sent by Chris Miller in email of 02/06/2013.

Based on input provided by Erin Jones (BLM) on 12/04/2012 and Dustin Bambrough (USFS) through Chris Miller email of 03/08/2013, all AUMs were considered open under Alternative A, and all AUMs in ADH were considered closed under Alternative C. Impacts under Alternative B were assumed to be the mid-point between impacts under Alternatives A and C. Impacts under Alternative D were assumed to be the mid-point between impacts under Alternatives A and B.

Please provide expected reduction in active and billed AUMs in the Proposed Plan relative to current management (Alternative A)

Data Request – Impacts of Management Alternatives on Grazing – Oregon:

To:

BLM: Stewart Allen, Jeanne DeBenedetti Keyes

Table R-1 below shows active and billed AUMs in GRSG habitat by FO used in the draft EIS.

Table R-1
Estimated Active Annual Animal Unit Months for Allotments in GRSG Habitat by Alternative for the Study Area

Field Office	Initial	Alternatives A, B, and E	Alternative C	Alternative D	Alternative F
Andrews	93,885	93,885	0	93,852	35,207
Baker	35,861	35,861	0	35,842	13,448
Central Oregon	52,555	52,555	0	52,555	19,708
Deschutes	19,307	19,307	0	19,307	7,240
Jordan and Malheur	402,788	402,788	0	399,728	151,046
Lakeview	162,227	162,227	0	156,587	60,835
Three Rivers	157,994	157,994	0	157,753	59,248
Socioeconomic Study Area	924,617	924,617	0	915,624	346,732

Data Sources:

- Active AUMs in GRSG habitat from data provided by Jeanne DeBenedetti Keyes on September 24, 2013 in a file titled "*LivestockGrazing_AUMS_Oregon_9232013*."

Based on exchanges with Jeanne DeBenedetti Keyes in September and October of 2013 (emails from Jeanne from September 30, October 01 and October 30), management alternatives were assumed to impact AUMs as follows:

Alternatives A, B, and E – Active AUMs in PPMA and PGMA remain open or closed as in current management (current management has 178,766 acres in GRSG habitat closed for grazing)

Alternative D – removes all Research Natural Areas (RNAs) with at least 20 percent of PPMA acres and 50 percent of PGMA acres. Closures to these areas would be voluntary or by termination.

Alternative F - 25 percent of the acreage in GRSG habitat would be rested each year and not available for grazing. In addition, Alternative F assumed a target utilization of only 25 percent of the non-rested acreage in GRSG habitat. This target utilization would be attempted by setting active AUMs at 50 percent of the non-rested acreage in GRSG habitat. This would result in the targeted 25 percent utilization of the non-rested area, if livestock operators follow NRCS stocking rate guides (that typically result in 50 percent use of the authorized area). Therefore, under Alternative F, active AUMs were set at 0.75 x 0.5 = 37.5 percent of the active AUMs under current management.

In addition, a high impact scenario was also estimated multiplying the loss in AUMs in the scenario above by an adjustment factor estimated based on Torell et al. 2014. *Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse*). This high impact scenarios accounts for additional losses of AUMs due to seasonal closures.

Please provide expected reduction in active and billed AUMs in the Proposed Plan relative to current management (Alternative A)

Data Request – Impacts of Management Alternatives on Grazing – Utah:

To:

BLM: Julie Suhr Pierce, Alan Bass

USFS: Chris Miller, Dustin Bambrough

Table W-1 below shows active and billed AUMs in GRSG habitat by FO and NF and by alternative. (*Note, Table W-1 was edited with respect the table in the draft EIS to make the data shown for BLM consistent with what we show for USFS – i.e., only AUMs in GRSG habitat*).

Table W. 1
Estimated Annual Animal Unit Months on Federal Lands, 2011

	Active			Billed		
	Alternative A, B, D and E	Alternative C1	Alternative C2	Alternative A, B, D and E	Alternative C1	Alternative C2
Cedar City FO	73,587	0	44,152	46,543	0	27,926
Fillmore FO	27,181	0	16,309	16,177	0	9,706
GSENM	1,920	0	1,152	961	0	577
Kanab FO	8,991	0	5,395	4,421	0	2,653
Moab FO	0	0	0	0	0	0
Price FO	12,845	0	7,707	6,582	0	3,949
Richfield FO	15,430	0	9,258	10,401	0	6,241
Salt Lake FO	98,028	0	58,817	76,515	0	45,909
Vernal FO	91,689	0	55,013	46,947	0	28,168
Sawtooth NF	12,348	0	7,409	12,348	0	7,409
Dixie NF	38,843	0	23,306	38,843	0	23,306
Fishlake NF	69,707	0	41,824	69,707	0	41,824
Manti-Lasal NF	55,561	0	33,337	55,561	0	33,337
Uinta-Wasatch-Cache NF	44,441	0	26,665	44,441	0	26,665
Ashley NF	43,329	0	25,997	43,329	0	25,997
Total	593,900	0	356,341	472,777	0	283,667

Data Sources:

- BLM data:
    1. Active AUMs from RAS as of August of 2012, sent by Josh Sidon on 08/07/2012. The data is in file titled "*count_term_auths_AUMs_2012-8-3.xlsx*."
    2. Billed AUMs from RAS over 20 years (to 2012), sent by Josh Sidon on 08/07/2012. The data is in file titled "*National_20_Years_Bills_2012-8-1.xlsx*."
    3. Loss of active and billed AUMs under Alternative C1 based on information provided by Alan Bass on 05/09/2103 to Josh Sidon in file titled "*Sage Grouse allotment se by field office and state*." Estimates for Active and Billed AUMs for Alternative C2 assume 60

percent of the AUMs made unavailable under Alternative C1 are made unavailable under Alternative C2

- USFS data:
    1. Active ("permitted") AUMs come from data provided by Dustin Bambrough on April 01, 2013, in file called "*UT_LivestockGrazing_AreaTotals_03_06_2013*." Data corresponds only to AUMs in portion of NFs within the study area and with sage-grouse habitat.
    2. Distribution of active AUMs among cattle, sheep and other, from data sent by Chris Miller on 02/06/2013 in file titled "miller_request_authorizedAUMs.xls."
    3. Billed (authorized) as a share of active (permitted) we agreed to use 100%.
    4. Loss of active and billed AUMs under Alternative C1 is all of those shown for Alternative A, because numbers for FS were already restricted to AUMs in GRSG habitat. Estimates for Active and Billed AUMs for Alternative C2 assume 60 percent of the AUMs made unavailable under Alternative C1 are made unavailable under Alternative C2.

Please provide expected reduction in active and billed AUMs in the Proposed Plan relative to current management (Alternative A)

GBR_PUB_1612
7.15

From: Fetter, Rob [Rob.Fetter@icfi.com]
Sent: Thursday, March 19, 2015 3:02 PM
To: Sidon, Joshua B
CC: ICF_SGSE
Subject: BLM SGSE - NMV appendices for sage grouse analysis

Josh,

Following up on our conversations this week, I spoke internally with ICF team members and wanted to give you an update. We understand BLM is interested in whether ICF could support the development of documents that would provide information about non-market values related to EISs to support sage grouse habitat conservation. The specifications, as we understand them, are as follows:

- Use the framework we created for other sage-grouse EISs (e.g. NW Colorado) to assess non-market values associated with recreation, also documenting the scientific/economic principles of non-market valuation generally
- The geographic scope would include all of the Rocky Mountain EISs (WY, ND, SD, and the remainder of MT not covered by the ID / SWMT EIS).
- Because the analysis would focus on recreational value, and there are few or no quantitative predictions of changes in recreational activity across the alternatives for those EISs, the analysis would focus primarily or perhaps exclusively on baseline assessment (within a defined recent time period, e.g., 2008-2012)
- For each EIS, deliverables would comprise a Word document of a few pages, plus the summary excel tables (to facilitate BLM doing additional manipulations it deems necessary)
- BLM would need draft deliverables completed by approximately April 6, and there would be a round of review and revision between approximately April 6 and approximately April 30.

Note that ICF would need BLM to provide recreation data for the desired years from the BLM RMIS system (Report 26, I believe). We would also use data from the FS NVUM system, which is publicly available online (in addition to data on non-market valuation from the work of John Loomis, and others).

We think this would fit within the scope of the current Task Order (it is closely related to the cumulative analysis), but would require a contract modification.

Please let me know if you have any questions or want to talk about this further.
Thanks,
Rob

Please Note New Phone Number:

T. ROBERT FETTER | Program Manager & Environmental Economist | 949.233.3042 (m) | rob.fetter@icfi.com | icfi.com

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GBR_PUB_1623
7.15

From: Uriarte, Alex [Alex.Uriarte@icfi.com]
Sent: Friday, February 20, 2015 4:19 PM
To: Julie Suhr Pierce (jsuhrpierce@blm.gov); Allen, Stewart; Miller, Chris J -FS (chrismiller@fs.fed.us); Lauren Mermejo (lmermejo@blm.gov); Sidon, Joshua B (jsidon@blm.gov)
CC: Johnson, Laura; Fetter, Rob; ICF_SGSE
Subject: BLM SGSE - Proposed Plan Socioeconomic Data Requests
Attachments: GRSG Proposed Plan Socioeconomic Data Requests.zip

Follow Up Flag: Follow up
Flag Status: Flagged

Julie, Stewart, Chris,

Please find attached requests for input from resource specialists for the socioeconomic analysis of potential impacts from the proposed plans for the four sub-regional EISs of the Great Basin region. The data requests are in four folders, one for each sub-region.

I would appreciate if you could take a quick look and let me know if you have any comments or suggestions for modifications. Per Lauren's suggestion, I will then forward these requests to the sub-regional leads, copying you:

Lauren Mermejo and Randy Sharp for NV/CA
Jonathan Beck for ID/MT
Quincy Bahr for Utah
Joan Suther for Oregon

Chris, please let me know if there is anyone else you think I should forward these to at the FS.

Josh, I will be sending you similar data requests for NWCO early next week. If you take a look at the attached data requests and feel we need to change the way they are presented, please do let me know.

Lauren, as promised, I am sending these data requests today to you as well, but I would appreciate if we would wait until early next week to distribute to the resource specialist, in case Julie, Stewart, Josh or Chris suggest changes.

Please note the following:

- We included in each data request the names of those who previously provided input for the socioeconomic analysis of the remaining alternatives.
- In addition, the data requests for NV/CA, ID/MT and Utah are also directed to Julie Suhr Pierce and the data requests for Oregon are also directed to Stewart Allen, under the understanding that Julie and Stewart will be able to help communicate our data needs with the various resource specialists, if needed. I am also available to interact directly with the resources specialists, as needed.

- We have also directed all the grazing data requests to Chris Miller and Dustin Bambrough for their input. Chris, please feel free look at the other data requests for NV/CA, ID/MT and Utah, in case you feel FS input is needed (e.g, recreation, wind energy).
- Because of the short time we will have to coordinate with resource specialists, we included as much information possible on the current socioeconomic impact analysis of the remaining alternatives to give resource specialists as much background as possible on how the requested data will be used, relative to the other alternatives analyzed
- We have not yet seen the proposed plans. We may have additional questions to resource specialists when the proposed plans become available to us.

Thank you. Please feel free to contact me if you have any questions or concerns,

Alex

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Data Request – Impacts of the Proposed Plan on Geothermal Development – Idaho/Montana:

To: Julie Suhr Pierce, Karen Porter

Based on input provided by Karen Porter to Josh Sidon and forwarded to ICF in June of 2013, and on review of draft sections, our conclusions on the potential economic impacts of management alternatives on geothermal development are described below:

Alternative A—Under Alternative A, the BLM predicts geothermal exploration and development activity would include 28 new exploratory and development wells with 20 production wells and 15 injection wells. Alternative A would not impact economic activity associated with geothermal leases, relative current management trends (BLM 2013i).

Alternative B—Under Alternative B, lands with high geothermal potential that overlap PPH would be closed to geothermal leasing, exploration and development, leaving approximately 39,000 acres outside of GRSG habitat open to leasing. However, the RFDS forecasts that 23 exploratory and development wells and less seismic operations than Alternative A would result in 20 production wells and 15 injection wells, which would be the same as under Alternative A, resulting in minimal or no economic impacts compared with Alternative A (BLM 2013i).

Alternatives C and F—Alternatives C and F would develop the same number of wells as Alternative B and similar outcomes as Alternatives A and B (BLM 2013i).

Alternatives D and E— Alternatives D and E would be similar to Alternative A in the number of wells and outcome (BLM 2013i).

Economic activity associated with geothermal development would be approximately the same for all alternatives, with no or minimal economic impacts compared to current management.

Request:

Please inform how the proposed plan would impact geothermal development, relative to the impacts from the remaining management alternatives described above.

Data Request – Impacts of Management Alternatives on Grazing – Idaho/Montana:

To:

BLM: Julie Suhr Pierce, Dominika Lepak

USFS: Chris Miller, Dustin Bambrough

Table R-1 below shows active and billed AUMs by FO and NS used in the draft EIS.

Table R-1
Current and Historical Annual Animal Unit Months Data

	Active AUMs[1]	Active AUMs in ADH[2]	Billed as Share of Active[3]
Bruneau Field Office	109,567	98,528	78%
Burley Field Office	123,505	76,765	72%
Challis Field Office	53,570	39,935	59%
Dillon Field Office	72,637	64,283	75%
Four Rivers Field Office	118,918	43,602	81%
Jarbidge Field Office	178,271	129,014	84%
Owyhee Field Office	125,140	101,029	86%
Pocatello Field Office	68,768	40,876	86%
Salmon Field Office	55,966	37,376	80%
Shoshone Field Office	196,137	182,430	61%
Upper Snake River Field Office	140,084	126,608	67%
Beaverhead-Deerlodge National Forest	154,629	42,832	100%
Boise National Forest	59,319	9,596	100%
Caribou-Targhee National Forest	288,344	59,660	100%
Salmon-Challis National Forest	146,804	54,478	100%
Sawtooth National Forest	155,511	83,244	100%
Socioeconomic Study Area	2,047,170	1,190,255	-

Data Sources:

- BLM data:
    1. Active AUMs and Active AUMs in ADH from data collected by John Courtright on June 03, 2013. The data was uploaded to ICF's FTP site by Josh Sidon on July 09, 2013. It is a large file (21MB) originally titled *"Active_Allotment_Range_Summary_JohnC.xlsx."*
    2. Billed AUMs as a share of active AUMs data from comparing active AUMs by FO in 2011 with billed average between 2000 and 2011, as provided to ICF by Josh on August 07, 2012 in the files *"National_20_Years_Bills_2012-8-1"* and *"County_term_uths_allots_AUMs_2012-8-3."*
- USFS data:
    1. Active ("permitted") AUMs from data provided by Dustin Bambrough on June 20, 2013, in a file called "*ID_MT_PermittedUse06192013*."

2. Active ("permitted") AUMs in ADH from data provided by Dustin Bambrough on July 16, 2013 in a file called *"ID_MT_PermittedUseGRSGHabitat06202013REVISED*." Note: Table R-1 shows 187 less Active AUMs in ADH for the Beaverhead-Deerlodge NF than what is shown in the Excel file. This must be due an adjustment per follow-up conversations, possibly the removal of an allotment (e.g. Bivens Creek or Dry Canyon).
3. Billed (authorized) as a share of active (permitted) we agreed to use 100%.

Based on exchanges with Dominika Lepak (BLM) and Dustin Bambrough (USFS) between June 05, 2013 and July 16, 2013, management alternatives were assumed to impact AUMs as follows:

Alternatives A, B, D and E – all AUMs remain open

Alternative C – AUMs in ADH are closed

Alternative F – 25% reduction in active and billed AUMs in ADH (scenario not accounting for the possibility that an initial reduction in AUMs on BLM-administered lands could lead to the loss of additional AUMs due to seasonal limitations in the availability of grazing areas – low scenario. A high scenario was also estimated multiplying the loss in AUMs in the low scenario by an adjustment factor estimated based on Torell et al. 2014. *Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse*, to account for seasonal closures

Request:

1. **Please provide expected reduction in active and billed AUMs in the proposed plan relative to current management (Alternative A)**
2. **Please discuss any additional costs on livestock operators imposed by the proposed plan (e.g. fencing, seasonal changes, restrictions on disturbance) and how these compare to the remaining alternatives.**

Data Request – Impacts of the Proposed Plan on Land and Realty and Travel Management – Idaho/Montana:

To: Julie Suhr Pierce, Natalie Cooper, Kelly Bockting

Based on information provided by Natalie Cooper and Kelly Bockting to Josh Sidon and forwarded to ICF in July of 2013 and on review of draft sections, our analysis of the potential economic impacts of management alternatives on land realty and travel management is described below:

Alternative A—Alternative A could result in some negative economic impacts on lands and realty and travel management associated with seasonal restrictions to road use to minimize disturbance to GRSG habitat. Alternative A would place the fewest restrictions on ROW development and route construction and maintain the largest area open to travel, among the alternatives. According to RFDS developed by BLM specialists, of the proposed 516 miles of new 500-kV transmission lines approximately 100 miles of new transmission lines could reasonably be expected to be built under Alternative A (BLM 2013i).

Alternative B—Alternative B could result in adverse impacts to economic activity related lands and realty and travel management by closing areas to ROW authorizations, limiting motorized travel on existing roads, and limiting new road construction in areas with primary GRSG habitat. In addition to restricted economic growth associated with road use and development restrictions, economic impacts would include increased costs associated with mandatory mitigation for surface disturbance that exceeds three percent for the area. Based on the RFDS, the BLM projects no new transmission lines (BLM 2013i). Alternative B would impose greater limitations and added costs to future economic investments in the study area compared with Alternative A.

Alternative C—Under Alternative C, economic impacts on lands and realty and travel management would be the same as under Alternative B.

Alternative D—Alternative D would result in economic impacts similar to those under Alternatives B and C because it would apply similar restrictions on motorized travel, except the restrictions would apply to medial and general habitat, as well as priority habitat. However, unlike as Alternatives B and C, Alternative D would not impose costs related to mandatory mitigation for surface disturbance. Costs resulting from restriction to infrastructure development under Alternative D would be greater than under Alternative A but less than under Alternatives B or C.

Alternative E—Management under Alternative E would have similar impacts as under Alternative A and fewer impacts than under Alternatives B, C, and D. The BLM estimates that Alternative E could result in some new transmission lines, depending on whether the proposed projects meet established criteria (BLM 2013i).

Alternative F—Economic impacts from Alternative F would be similar to those under Alternatives B and C, except that Alternative F would limit motorized travel in restoration areas, as well as primary habitat, and would prohibit new road construction within a four-mile buffer from leks. Economic impacts from Alternative F would be greater than impacts under all other alternatives. However, the BLM does expect that development of transmission lines would be similar to that under Alternative A, with 100 miles of new transmission lines in the foreseeable future (BLM 2013i).

Under Alternative B, C, and F, agencies would aim to remove, bury or modify existing power lines in PPMAs. Under Alternative D, “new power and communication lines (50 KV or less), outside of existing ROWs, would be buried, where physically feasible.” During the reauthorization of existing distribution lines, the physical feasibility of burying lines would also be considered. These Alternative D management actions would apply to PPMA, PMMA, and PGMA. All the action alternatives include restrictions in habitat that might require all new ROW or SUA routes to be modified or to implement mitigation.

Request:

Please inform how the impacts of the proposed plan on land and realty and travel management will differ from those described above for the remaining alternatives.

Data Request – Impacts of the Proposed Plan on Phosphate, Locatable and Salable Minerals – Idaho/Montana:

To: Julie Suhr Pierce, Karen Porter

Based on input provided by Karen Porter to Josh Sidon and forwarded to ICF in June of 2013 and in June and July of 2014, and on review of draft sections, our conclusions on the potential economic impacts of management alternatives on phosphate, salable and locatable minerals are described below:

Under Alternatives A and E, KPLAs would be open to phosphate mining. No additional lands would be withdrawn from locatable mineral entry (see **Section 4.9**, Locatable Minerals). No additional lands would be closed to mineral material disposal.

Alternatives B, C and F would close priority habitat to phosphate mining. Of the KPLAs, the only one affected would be in the Paris-Bloomington area. In December of 2012, Stonegate Agricom announced positive results of its Feasiblity Study for the development of an underground phosphate mine (known as the Paris Hills Phosphate project). The project has been estimated to have a mine life of 19 years producing a total of 16.7 million tonnes of phosephate rock ore (Agapito Associates, Inc. 2013). The proportion of these production projections that could be attributable to Federal minerals is not known. However, to the extent that Federal minerals account of a portion of estimated reserves, the closing of PPMA to leasing could remove up to 395 acres of Federal mineral estate from being accessed. Valid existing rights associated with the current lease of 65 acres would prevent this area from closure, but any development would be subject to RDFs which, as discussed in **Section 4.12** Nonenergy Leasable Minerals, would limit surface disturbance, vehicle use, siting, and design of mineral development operations, in addition to imposing reclamation requirements. If implementing RDFs is not feasible once mining operations commence on this existing lease, off-site mitigation may be required. Together these management actions could result in a reduction of phosphate recovered and increased costs of the project. Impacts under Alternative D may be relatively less because, while Alternative D closes PPMA and PMMA to future leasing and prospecting of phosphate, it allows for exceptions for lease modifications and fringe leases where valid existing rights may be affected.

No Reasonably Foreseeably Development scenario for phosphate exists that quantifies current phosphate reserves on private and public lands and forecasts production of those reserves. In the absence of this information and any proposed plans for leasing and developing Federal minerals for phosphate in GRSG habitat, it is not possible to quantify any additional potential economic impacts across alternatives over the planning horizon. With the exception of the Paris-Bloomington KPLA discussed above, no economic impacts on future phosphate development in other KPLA areas are expected due to the minimal GRSG habitat in these areas.

The potential for phosphate production from Federal lands outside of KPLA areas is generally low. Since PPMA would be closed to phosphate development under Alternatives B, C, D, and F, phosphate leasing, prospecting or mining would be affected in areas outside of KPLAs that overlap with PPMA. Furthermore, under Alternative D, management actions in PGMA would restriction exploration and development of nonenergy leasable minerals including timing restrictions, specific stipulations, and possible off-site mitigation. These management actions could affect the cost of exploration and development of phosphate in general habitat. Overall, potential economic impacts associated with phosphate-related activities under Alternatives B, C, D, and F are anticipated to be minimal given the limited amount of priority habitat in areas of southeast Idaho where phosphate occurs.

Alternatives B, C, and F would also recommend withdrawing PPMA from locatable mineral development. Mineral material disposal would be closed in PPMA and restoration of salable mineral pits no longer in use would be required to meet GRSG conservation objectives (see **Section 4.10**, Mineral Materials). Alternative D closes fewer acres to mineral material disposal, but does include restrictions across all GRSG habitat. Specifically, no new mineral material pits would be authorized within 3 km of an occupied lek and mineral disposal in GRSG habitat would be subject to timing restrictions. Alternative D would also require restoration of salable mineral pits no longer in use and would require reclamation bonds for new (commercial or non-profit) authorizations in PPMA habitat.

Economic activity associated with management of phosphate, locatable minerals and salable mineral materials would be the same for Alternatives A and E, slightly lower (due to reduced exploration activity) under Alternative D, and lower still under Alternatives B, C, and F. Any adverse impacts on mining under Alternatives B, C, and F would mostly likely be felt in counties such as Caribou and Cassia, where the mining industry is an important economic contributor for some communities and mineral activity has the highest likelihood of overlapping with GRSG habitat.

Request:

Please inform how the proposed plan would impact phosphate, locatable and salable minerals, relative to the impacts from the remaining management alternatives described above.

Data Request – Impacts of the Proposed Plan on Oil and Gas Development – Idaho/Montana:

To: Julie Suhr Pierce, Karen Porter

Input provided by Karen Porter to Josh Sidon and forwarded to ICF in June of 2013 indicates that the number of wells and production capacity would be the same for Alternatives A, D, and E. In Alternatives B, C, and F, management actions would restrict exploration and development activity to fewer than half the number of oil and gas leases and approximately two-thirds of the production capacity. The socioeconomics section currently describes the impact of management alternatives on oil and gas development as follows:

Alternative A—Alternative A would continue current trends in economic activity associated with oil and gas leases. Alternative A would drill 47 wells, including 35 wildcat wells and 12 step-out wells, over a 20 year period. The BLM estimates that 16 wells would be productive, with 28 billion cubic feet of production capacity.

Alternative B—Alternative B would result in economic impacts associated with restrictions on new surface occupancy, seasonal and methodological restrictions on exploratory drilling, limits on proposed surface disturbance for existing leases, and mandatory mitigation in priority habitats. Alternative B would also impose costs related to required full site-specific reclamation bonds to cover costs to restore the lands to pre-disturbance condition. Drilling and production would drop, compared to Alternative A, with approximately 33 wells drilled, including 27 wildcat wells and 6 step-out wells; 8 wells would be productive, with 20.5 billion cubic feet of production capacity.

Alternative C—Economic impacts under Alternative C would be similar to those under Alternative B. Alternative C would cause a reduction in economic activity by closing 80 percent of the planning area to oil and gas leases. Alternative C would result in lost economic activity related to required relinquishment of leases/authorizations (BLM 2013f), similar to those of Alternative B.

Alternative D—Alternative D would close the same number of acres of federal mineral estate with high oil and gas potential as Alternative A, and economic impacts would be similar to Alternative A.

Alternative E—Alternative E would have similar economic impacts as Alternatives A and D. Alternative E involves some restrictions to surface development to minimize impacts on GRSG habitat, which would have minor economic impacts (BLM 2013f).

Alternative F—Economic impacts under Alternative F would be similar to the impacts under Alternatives B and C (BLM 2013f).

Request:

Please inform how the proposed plan would impact oil and gas development in the planning area, relative to the impacts of the remaining management alternatives, as described above.

Data Request – Impacts of <u>All Management Alternatives</u> on Recreation – Idaho/Montana:

To:

BLM: Julie Suhr Pierce, Robin Fehlau,

USFS: Chris Miller

The DEIS socioeconomics analysis used the following information on nonlocal visits to the planning area, by alternative, to discuss potential socioeconomic impacts of management alternatives on recreation:

Table R-1
Estimated Nonlocal Visits, Average Annual (2015–2034)

Alternative	Nonlocal Day	Nonlocal Overnight on BLM	Nonlocal Overnight off BLM	Total Nonlocal
Alternative A	1,593,506	637,402	1,434,155	3,665,063
Alternative B	1,630,223	652,089	1,467,200	3,749,512
Alternative C	1,197,617	479,047	1,077,856	2,754,520
Alternative D	1,704,370	681,748	1,533,933	3,920,052
Alternative E	1,704,370	681,748	1,533,933	3,920,052
Alternative F	1,273,852	509,541	1,146,467	2,929,860

This table was produced based on data for FY 2012 from BLM's Recreation Management Information System and growth projections by alternative provided by Robin Fehlau to Josh Sidon in June of 2013. Visits to FS lands are not included because the Forest Service recreational specialist determined that the overall number of visits to the National Forests would be unchanged, because potentially affected recreational activities are unlikely to occur during times that overlap with leks, and any displaced recreational activity is likely to move to another nearby location (i.e., recreational activity will simply move rather than ceasing altogether).

<u>However, the DEIS did not include a recreation section under the argument that impacts on recreation would be expected to be negligible</u>.

Request:

1. **Please clarify whether the impacts of management alternatives on recreation would be expected to be negligible or whether the projections presented in Table R-6 should be used.**
2. **If the impacts of management alternatives on recreation area not negligible, please inform how the impacts of the proposed plan on recreation will differ from those described above for the remaining alternatives.**

Data Request – Impacts of the Proposed Plan on Wind Energy Development – Idaho/Montana:

To:

BLM: Julie Suhr Pierce, Natalie Cooper, Kelly Bockting

Based on information provided by Natalie Cooper and Kelly Bockting to Josh Sidon and forwarded to ICF in July of 2013, BLM expects approximately 465 MW of wind energy development in Idaho, none in Montana, under Alternatives A and F. BLM anticipates that Alternatives B through D may prevent wind energy development entirely. Alternative E could limit future wind energy development, with some development possible, depending on fulfillment of criteria established by the alternative (BLM 2013i). Thus, Alternatives B through E would result in lower annual output, employment, and earnings related to wind energy development compared to Alternatives A and F.

Request:

Please inform how the impacts of the proposed plan on wind energy development would compare with the impacts of the remaining management alternatives, as described above.

Data Request – Impacts of the Proposed Plan on Geothermal Development – Nevada/California:

To: Julie Suhr Pierce, David Davis

Based on information provided by David Davis in June of 2014, and on review of DEIS sections, our conclusions on the potential economic impacts of management alternatives on geothermal development are described below. Alternative G is the analysis of the draft proposed plan, as discussed in June of 2014:

Alternative A—Under Alternative A, BLM predicts geothermal exploration and development activity would proceed according to the Geothermal RFDS scenario. This entails 56 new production wells and 38 new injection
wells. As a result of these wells, 12 power plants would come online (BLM 2013h, BLM 2014x).

Alternative B—Under Alternative B, lands with high geothermal potential that overlap PPMAs would be closed to geothermal leasing, exploration, and development. It is uncertain which future geothermal projects would be located within these lands; however, it is estimated that geothermal exploration and development could be reduced by 20 to 50 percent (BLM 2013h, BLM 2014x). BLM used the midpoint of this range to estimate expected reductions in output, employment, and earnings compared to Alternative A.

Alternative C—Under Alternative C, closure of public lands to fluid mineral leasing would restrict the amount of new geothermal leasing exploration and development that would otherwise occur. It is estimated that geothermal exploration and development would be reduced by 30 to 70 percent (BLM 2013h, BLM 2014x). The BLM used the midpoint of this range to estimate expected reductions in output, employment, and earnings compared to Alternative A.

Alternative D—Under Alternative D, NSO restrictions would reduce the availability of PPMAs and PGMAs to geothermal exploration and development. As a result, it is estimated that geothermal exploration and development could be reduced by approximately 20 to 40 percent (BLM 2013h, BLM 2014x). BLM used the midpoint of this range to estimate expected reductions in output, employment, and earnings compared to Alternative A.

Alternative E—Under Alternative E, it is estimated that drilling and exploration would be close to that identified in Alternative A (BLM 2013h, BLM 2014x). Thus, BLM predicts there would be no reduction in output, employment or earnings compared to Alternative A.

Alternative F—Constraints on geothermal leasing, exploration and development in this alternative would be similar to those in Alternative C (BLM 2013h, BLM 2014x). Thus, the BLM estimated that reductions in output, employment, and earnings would be identical to those of Alternative C.

Alternative G—Under Alternative G, NSO restrictions would reduce the availability of PPMAs and PGMAs to geothermal exploration and development. As a result, it is estimated that geothermal exploration and development could be reduced by approximately 20 to 40 percent (BLM 2013h, BLM 2014x). BLM used the midpoint of this range to estimate expected reductions in output, employment, and earnings compared to Alternative A.

Request:

Please inform whether the impacts of Alternative G on geothermal development are still an accurate reflection of the potential impacts of the proposed plan. If not, please inform how our description of these impacts should be changed to accurately capture the potential impacts of the proposed plan on geothermal development.

Data Request – Impacts of the Proposed Plan on Grazing – Nevada/California:

To:

BLM: Julie Suhr Pierce, Mike Tietmeyer

USFS: Chris Miller, Dustin Bambrough

Table R-1 below shows active AUMs in the study area, by alternative, used in the draft EIS. The data in this table is NOT AUMs in GRSG habitat, but rather in the entire study area. The data is consistent with the following AUMs in GRSG habitat in the study area, as used in Appendix K of the DEIS:

Forest Service	275,248 AUMs
California BLM	172,231 AUMs
Nevada BLM	1,762,997 AUMs

Table R-1
Estimated Active Annual Animal Unit Months by Alternative for the Study Area

Agency	Initial	Alternatives A, B, D, E and G	Alternative C	Alternative F
		Active		
Forest Service	276,191	276,191	943	104,161
California BLM	191,733	191,733	19,502	84,089
Nevada BLM	2,088,722	2,088,722	325,725	986,849
Socioeconomic Study Area	2,556,646	2,556,646	346,170	1,175,098

Data Sources:

- BLM data:
  1. Active AUMs for 2011 by FO and share of Active AUMs billed (based on 2000-2011 average) from RAS query of 07/03/2012.
  2. Active AUMs in GRSG habitat from Appendix K of Draft EIS, provided by Josh Sidon in email of 06/17/2014.
- USFS data:
  1. Active ("permitted") AUMs for the H-T NF sent by Josh Sidon in email of 06/03/2013 based on conversations with Chris Miller and Dustin Bambrough.
  2. Active ("permitted") AUMs in GRSG habitat from Appendix K of Draft EIS, provided by Josh Sidon in email of 06/17/2014
  3. Billed (authorized) as a share of active (permitted) for H-T NF assumed 85%, based on 2000-2011 Avg.

Based on previous information provided by BLM (Mike Tietmeyer) and FS (Dustin Bambrough), management alternatives were assumed to impact AUMs as follows (*where Alternative G is the draft proposed plan*):

Alternatives A, B, D, E, and G – forage availability remains the same as under current management

Alternative C – all AUMs in GRSG habitat closed

Alternative F – 62.5 percent of active AUMs in GRSG habitat closed (25 percent of the area in GRSG habitat must be rested each year. Of the remaining 75 percent, 50 percent must be set aside).

In addition, a high impact scenario was also estimated multiplying the loss in AUMs in the scenario above by an adjustment factor estimated based on Torell et al. 2014. *Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse*). This high impact scenario accounts for additional losses of AUMs due to seasonal closures.

Request:

1. **Please provide expected reduction in active AUMs in the revised proposed plan relative to Alternative A, or confirm that the active AUMs remain the same as those under Alternatives A, B, D and E.**
2. **Please discuss any additional costs on livestock operators imposed by the proposed plan (e.g. fencing, seasonal changes, restrictions on disturbance) and how these compare to the remaining alternatives.**

Data Request – Impacts of the Proposed Plan on Land and Realty and Travel Management – Nevada/California:

To: Julie Suhr Pierce, Leo Drumm, Daniel Ryan

Based on input provided by Leo Drumm and Daniel Ryan to Josh Sidon in June of 2014 and on review of DEIS sections, our analysis of the potential economic impacts of management alternatives on land realty and travel management is described below. Alternative G is the analysis of the draft proposed plan, as discussed in June of 2014:

Alternative A—Alternative A would place the fewest restrictions on ROW development and route construction and maintain the largest area open to travel, among the alternatives.

Alternative B—Management actions under Alternative B to protect GRSG habitat would impact lands and realty through the exclusion of PPMA to new ROW and special use authorizations, additional criteria for land exchanges, and limitations on new mineral development and road construction. Motorized travel would be limited to existing routes in PPMAs unless BLM or Forest Service has completed travel management plans which designate specific roads (routes) for motorized travel. Routes constructed in excess of a 3 percent disturbance cap would face increased costs with mitigation resulting from the loss of habitat. Existing power lines would be evaluated for removal, burying, or modification. Alternative B would impose limitations and added costs to future economic investments in the study area compared with Alternative A.

Alternative C—Under Alternative C, impacts on ROW authorizations would be similar to Alternative B, but exclusion would apply to all GRSG habitat, affecting 7 million more acres than Alternative B. There would be no designated corridors to accommodate new ROW infrastructure. Additionally, travel management under Alternative C would have similar impacts as Alternative B, with added restrictions: route construction would require a 4-mile buffer from leks in PPMAs and PGMAs. Alternative C would impose the most limitations and added costs to future economic investments in the study area.

Alternative D—ROW development and SUAs under Alternative D would also face restrictions, but these would be more limited than under Alternatives B and C, except for wind and solar development, which remain excluded in GRSG habitat under Alternative D. Management would direct new and existing (during amendment or renewal processes) power lines to be buried unless not technically feasible. Technical feasibility would be determined on a project-by-project basis. A determination as to whether something is considered technically feasible would be based on local conditions, such as vegetation, topography, or project size. Restriction and costs to infrastructure development under Alternative D would be greater than under Alternative A but less than under Alternatives B or C.

Alternative E—Management under Alternative E would have similar impacts as Alternative A, and less than under Alternatives B, C, and D. Power lines of up to 35 kV would be buried where ground disturbance can be minimized and power lines of higher voltage would be buried when economically and technically feasible. All new ROWs in SGMA would require consultation and application of the "avoid, minimize, mitigate" process to ensure no net unmitigated loss of GRSG habitat. The Nevada Conservation Credit System may be used to achieve a goal of no net unmitigated loss of GRSG habitat.

Alternative F—Impacts from Alternative F would be the same as those under Alternative B.

Alternative G—Alternative G could impose some costs to project proponents relative to Alternative A. Designated corridors within GRSG habitat would remain open and GRSG habitat outside of designated corridors would be managed as avoidance areas, not exclusion areas, for all ROWs. Chapter 2 identifies specific conditions for siting new ROWs when avoidance is not possible. New power lines in GRSG habitat would be buried unless not technically feasible or the cost would be prohibitive. During permit renewal, amendment, or reauthorization of existing power lines, the ROW holder would be required to relocated or bury lines unless not technically feasible or contrary to policy. Technical feasibility would be determined on a project-by-project basis. A determination as to whether something is considered technically feasible would be based on local conditions, such as vegetation, topography, or project size. In addition, as in Alternative E, all disturbance would be subject to no net unmitigated loss in GRSG habitat, which could potentially result in associated mitigation costs. In the case of a hard trigger, the adaptive management response for land authorizations would change areas outside of designated corridors to exclusion areas for high voltage transmission lines (greater than or equal to 100 kV) and major pipelines (greater than or equal to 24 inch) potentially leading to increased costs to applicable projects.

Request:

Please inform how the impacts of the proposed plan on land and realty and travel management will differ from those described above for Alternative G and suggest any necessary changes.

Data Request – Impacts of the Proposed Plan on Locatable and Salable Minerals – Nevada/California:

To: Julie Suhr Pierce, Thomas (Scott) Murrellwright, Leisa Wesch

Based on input provided Scott Murrellwright, Leisa Wesch and Randy Sharp (Sharp Consultants) in June of 2014, and on review of DEIS sections, our conclusions on the potential economic impacts of management alternatives on salable and locatable minerals are described below. Alternative G is the analysis of the draft proposed plan, as discussed in June of 2014:

Locatable Minerals:

Under Alternatives B, C, and F, costs could arise for validity exams for claims or operations looking to expand in areas recommended for withdrawal. In addition, no new claims could be made to explore or mine locatable minerals in withdrawn areas which could possibly impact economic activity compared to Alternatives A, D, E, and G.

Overall, economic activity associated with management of locatable minerals would be the same for Alternatives A, D, E and G, and may be lower under Alternatives B, C, and F depending on site-specific and operator-specific conditions.

Salable Minerals

GRSG habitat management alternatives would impose restrictions on development of salable mineral production, particularly under Alternatives B, C, D, F, and G. Specifically, all new mineral material disposal would be closed in PPMA under Alternatives B, C, and F and in both PPMA and PGMA under Alternatives D and G. No areas would be closed to new mineral material disposal under Alternative E, but any new pits would require consultation and application of the “avoid, minimize, mitigate” process to ensure no net unmitigated loss of GRSG habitat. Under both Alternatives D and G, existing pits could be expanded under certain requirements (see **Section 4.14**, Minerals – Salable).

Closing areas to mineral material sales in Alternatives B, C, D, F, and G could increase costs for commercial and public users of mineral materials. Because transportation of mineral materials is typically a cost driver, especially for municipal users, closing pits could have a measurable financial impact on entities that depend on sand and gravel from BLM-administered lands. The BLM would attempt to reduce this impact by identifying new pits proximate to identified needs, but at the stage of this analysis – without knowing the location, timing, and amounts needed – it is not possible to determine the economic impacts on either municipal or commercial entities.

Overall, economic activity associated with salable mineral materials would be generally the same for Alternatives A and E, and may be lower under Alternatives B, C, D, F, and G.

Request:

Please inform whether the impacts of Alternative G on locatable and salable minerals still are still an accurate reflection of the potential impacts of the proposed plan. If not, please inform how our description of these impacts should be changed to accurately capture the potential impacts of the proposed plan on salable and locatable minerals.

Data Request – Impacts of the Proposed Plan on Oil and Gas Development – Nevada/California:

To: Julie Suhr Pierce, John Menghini

Table R-8 below reflects expected oil and gas wells drilled and producing under the various management alternatives analyzed. The table is based on input provided by John Mengini in January of 2014 and information provided on a draft proposed plan in July of 2014 (Alternative G).

Table R-8

Oil and Gas Wells and Production

Alternative	Oil Wells Expected to be Drilled			Oil Wells Expected to be Producing		
	Existing Leases	New Leases	Total	Existing Leases	New Leases	Total
A	70	30	100	14	6	20
B and F	0	0	0	0	0	0
C	30	10	40	6	2	8
D and G	40	20	60	8	4	12
E	50	30	80	10	6	16

Request:

Please confirm whether impact of the proposed plan on oil and gas production is correctly reflected in Alternative G in Table R-8.

Data Request – Impacts of the Proposed Plan on Recreation – Nevada/California:

To: Julie Suhr Pierce, Leo Drumm

Based on input provided by Leo Drumm to Josh Sidon on June 12, 2014 and on review of DEIS sections, our analysis of the potential economic impacts of management alternatives on recreation is described below. Alternative G is the analysis of the draft proposed plan, as discussed in June of 2014:

For Alternatives B through G, the net economic effect on recreational activity is not possible to quantify, but would likely be very small. The primary effect on recreational activity would be related to change in designation from open to limited for OHV use, and as noted above (and in **Section 4.18**, Recreation), BLM recreation specialists expect that use overall would not change.

Alternative A—Under Alternative A, existing recreation opportunities in the study area would be maintained. Alternative A would not result in impacts on revenue of commercial recreation service providers or managing agencies attributable to BLM SRPs and Forest Service SUAs, as it would result in no changes to current management.

Alternative B—The restrictions on BLM SRPs and Forest Service SUAs documented in **Section 4.18**, Recreation, may result in modifications for some types of permitted uses (e.g., OHV races) on PPMAs, potentially resulting in fewer opportunities for this type of event. As noted above, the OHV area designation change on PPMAs (from open to limited) may result in small changes in patterns of OHV travel in the study area, but public lands recreation specialists do not anticipate any changes in recreational use. The economic effect from recreational activity is not possible to quantify, but if there is any difference versus Alternative A from restrictions on BLM SRPs and Forest Service SUAs, it is likely to be very small.

Alternative C—Economic impacts of Alternative C with respect to BLM SRPs and Forest Service SUAs are the same as Alternative A. There would be no anticipated change in economic impacts with respect to the OHV area designation change on PPMAs and PGMAs because public lands recreation specialists do not anticipate any changes in recreational use. Thus, economic impacts with respect to recreation would be the same as in Alternative A.

Alternative D—Under Alternative D, BLM SRPs and Forest Service SUAs could be restricted for some types of permitted uses (e.g., OHV races) on PPMAs and PGMAs, which may (but would not necessarily, for the reasons noted above) result in reduced economic activity associated with these events. There would be no anticipated change in economic impacts with respect to the OHV area designation change on PPMAs and PGMAs, because public lands recreation specialists do not anticipate any changes in recreational use. The economic effect from recreational activity is not possible to quantify, but if there is any difference versus Alternative A from restrictions on BLM SRPs and Forest Service recreation permits, it is likely to be very small.

Alternative E—Alternative E would result in the same economic impacts related to recreation as in Alternative A.

Alternative F—Alternative F would result in the same economic impacts related to recreation as in Alternatives B and D.

Alternative G—Alternative G would result in similar impacts to recreation as Alternative D. Some additional closures and seasonal restrictions could occur due to travel management adjustments, based on monitoring of impacts to GRSG habitat, with additional impacts on recreation.

Request:

Please inform how the impacts of the proposed plan on recreation will differ from those described above for Alternative G and suggest any necessary changes.

Data Request – Impacts of the Proposed Plan on Wind Energy Development – Nevada/California:

To: Julie Suhr Pierce, Wendy Seley

Based on information provided by Wendy Seley and forwarded to ICF by Josh Sidon on 06/10/2014, the BLM currently has five applications for development of wind energy projects within the study area. The projected installed capacity for these projects is approximately 1,405 MW in Elko and White Pine Counties and 151 MW in Washoe and Lassen Counties, for a total of 1,556 MW. Under Alternative A, BLM expects these projects to be implemented. The BLM anticipates that none of these projects would receive approval under Alternatives B through F. The same email indicated that no wind energy development would be expected under Alternative G (the draft proposed plan).

Request:

Please confirm that none of the 1,556 MW of wind energy referred to above would be expected to develop under the proposed plan.

Data Request – Impacts of the Proposed Plan on Geothermal Development – Oregon

To: Stewart Allen, Timothy Barnes

Based on information provided by Timothy Barnes to Josh Sidon and forwarded to ICF on June 05, 2013 and on review of draft sections, our conclusions on the impact of management alternatives on geothermal development are described below:

Alternative A

Under Alternative A, the BLM projects the 170 megawatts of geothermal energy shown in **Table 4-51** to be in place by 2025.

Table 4-1
Reasonable Foreseeable Development Scenario for Geothermal Energy on BLM-Administered Lands

Area	Projected MW at 2025	BLM Field Office
Neal Hot Springs	50	Vale
Lakeview – Hot Lake Area	20	Lakeview
Summer Lake	50	Lakeview
Other Potential Locations	50	Includes Burns and Vale
Total	170	

Alternatives B and E

Access to geothermal potential could be limited. Acres open to leasing would be reduced by over one-third, compared with Alternative A, which could reduce access to geothermal potential. If these closures were to include the areas identified in the geothermal reasonably foreseeable development scenario, the development of geothermal energy could also be reduced, compared to Alternative A.

Alternatives C and F

Acres open to leasing would be reduced by approximately 75 percent. Alternatives C and F would be the most likely to constrain development of geothermal energy resources. If closures were to include the areas identified in the geothermal reasonably foreseeable development scenario, the development of geothermal energy would be reduced, relative to Alternative A.

Alternative D

Based on acres open to leasing, projected employment under Alternative D would be the same as under Alternative A. However, some decrease relative to Alternative A could occur due to NSO stipulations in buffer areas around leks.

Request:

Please inform how the proposed plan would impact geothermal development relative to the impacts of the other alternatives described above.

Data Request – Impacts of Proposed Plan on Grazing – Oregon:

To: Stewart Allen, Jeanne DeBenedetti Keyes, Bob Hopper

Table R-1 below shows active and billed AUMs in GRSG habitat by FO used in the draft EIS.

Table R-1
Estimated Active Annual Animal Unit Months for Allotments in GRSG Habitat by Alternative for the Study Area

Field Office	Initial	Alternatives A, B, and E	Alternative C	Alternative D	Alternative F
Andrews	93,885	93,885	0	93,852	35,207
Baker	35,861	35,861	0	35,842	13,448
Central Oregon	52,555	52,555	0	52,555	19,708
Deschutes	19,307	19,307	0	19,307	7,240
Jordan and Malheur	402,788	402,788	0	399,728	151,046
Lakeview	162,227	162,227	0	156,587	60,835
Three Rivers	157,994	157,994	0	157,753	59,248
Socioeconomic Study Area	924,617	924,617	0	915,624	346,732

Data Sources:

- Active AUMs in GRSG habitat from data provided by Jeanne DeBenedetti Keyes on September 24, 2013 in a file titled "*LivestockGrazing_AUMS_Oregon_9232013*."

Based on exchanges with Jeanne DeBenedetti Keyes in September and October of 2013 (emails from Jeanne from September 30, October 01 and October 30), management alternatives were assumed to impact AUMs as follows:

Alternatives A, B, and E – Active AUMs in PPMA and PGMA remain open or closed as in current management (current management has 178,766 acres in GRSG habitat closed for grazing)

Alternative D – removes all Research Natural Areas (RNAs) with at least 20 percent of PPMA acres and 50 percent of PGMA acres. Closures to these areas would be voluntary or by termination.

Alternative F - 25 percent of the acreage in GRSG habitat would be rested each year and not available for grazing. In addition, Alternative F assumed a target utilization of only 25 percent of the non-rested acreage in GRSG habitat. This target utilization would be attempted by setting active AUMs at 50 percent of the non-rested acreage in GRSG habitat. This would result in the targeted 25 percent utilization of the non-rested area, if livestock operators follow NRCS stocking rate guides (that typically result in 50 percent use of the authorized area). Therefore, under Alternative F, active AUMs were set at 0.75 x 0.5 = 37.5 percent of the active AUMs under current management.

In addition, a high impact scenario was also estimated multiplying the loss in AUMs in the scenario above by an adjustment factor estimated based on Torell et al. 2014. *Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse*). This high impact scenarios accounts for additional losses of AUMs due to seasonal closures.

Request:

1. **Please provide expected reduction in active and billed AUMs in the proposed plan relative to current management (Alternative A)**
2. **Please discuss any additional costs on livestock operators imposed by the proposed plan (e.g. fencing, seasonal changes, restrictions on disturbance) and how these compare to the remaining alternatives.**

Data Request – Impacts of the Proposed Plan on Land and Realty and Travel Management – Oregon

To: Stewart Allen, Christopher Knauf

Based on input provided by Christopher Knauf to Josh Sidon in May of 2014 and on review of draft sections, our analysis of the potential economic impacts of management alternatives on land and realty and travel management is described below:

Alternative A
Alternative A would place the fewest restrictions on ROW development and route construction and would maintain the largest area open to travel, among the alternatives; therefore, having the least impacts of the alternatives.

Alternative B
Management actions under Alternative B to protect Greater Sage-Grouse habitat would impact lands and realty through the closure of PPMA to new ROW authorizations. All cross-country motorized travel would also be prohibited except for designated routes; that is, motorized travel would be limited to existing routes. Alternative B would impose added costs to future economic investments in the Study Area, when compared to Alternative A.

Alternative C
All Greater Sage-Grouse habitat, PPMA, and PGMA would be closed to new ROW authorizations. This alternative would impose the greatest restrictions on new infrastructure development. Potential new investments in power lines, pipelines, roads and renewable energy projects requiring new ROW authorizations in Greater Sage-Grouse habitat would not occur, potentially reducing the generation of associated employment and earnings opportunities. To the extent that new projects are modified to move forward off Grater Sage-Grouse habitat, economic activity generated by the construction and operation of a modified project would support regional economic activity. However, modification to projects would typically have a cost. To the extent possible, utilities would be expected to pass these costs to consumers. Restrictions on travel management would be the same as those under Alternative A.

Alternative D
ROW development under Alternative D would also face restrictions, but these would be more limited than under Alternatives B and C. Exclusion areas in Greater Sage-Grouse habitat would be the same as under Alternative A, but PPMA would be managed as avoidance. Burial of power lines could be required when technically and financially feasible. Restrictions to travel would be the same as those under Alternative B. Restriction and costs to infrastructure development under Alternative D would be greater than under Alternative A but less than under Alternatives B or C.

Alternative E
Management under Alternative E would have impacts similar to Alternative A for land use authorizations. Impacts also are similar to Alternative A for travel management, given that only seasonal limits would be imposed near leks. Together with Alternative A, Alternative E would impose the least restrictions on infrastructure development and transport in the Study Area.

Alternative F

Impacts from Alternative F are the same as or similar to those under Alternative B, except there would be greater restrictions under Alternative F for wind energy, as previously described. New road construction or upgrades would not be allowed in Greater Sage-Grouse habitat, resulting in future potential limitations to economic activity in the area.

Restrictions to ROW development under Alternatives B, C, D, E and F could require investors to relocate or reroute infrastructure investments. When feasible, such modifications would have a cost that would typically be expected to be passed on to consumers. A 2012 WECC study, for example, provides information on transmission line costs per mile, ranging from $927 thousand to $2,967 thousand depending on voltage and whether lines are single or double circuit lines. The same study provides cost multipliers for difficult terrains, reaching up to 2.25 in the case of forested lands (WECC 2012). Because utility providers allocate costs on to their rate base, per-customer rate impacts would be greater where the ratepayer base is smaller, all else equal (i.e., given an identical fixed cost associated with burial of transmission lines). Areas with smaller/local utility providers with fewer ratepayers would be required to absorb a greater proportion of the costs of relocation or rerouting compared to areas serviced by larger, multi-state providers. Alternative D would require burial of transmission lines when technically and financially feasible. New construction costs of underground transmission lines can be between 4 and 14 times higher (PSC 2011), depending on terrain, although burial of existing lines would be a fraction of the cost of new lines. Burial of distribution lines would be considerably less, averaging under $500 per mile in rural areas (EIA 2012).

Request:

Please inform how the proposed plan would impact land and realty and travel management relative to the impacts described above for the remaining alternatives.

Data Request – Impacts of the Proposed Plan on Oil and Gas, Locatable and Salable Minerals – Oregon:

To: Stewart Allen, Timothy Barnes

Based on input provided by Timothy Barnes to Josh Sidon and forwarded to ICF on June 05 of 2013, and on review of draft sections, our conclusions on the potential economic impacts of management alternatives on oil and gas, salable and locatable minerals are described below:

Oil and gas:

Any future production of oil and gas in the Study Area would have the greatest impacts under Alternatives C and F, under which all Greater Sage-Grouse habitat would be closed for exploration. Alternatives B and E would impose fewer closures than Alternatives C and F (all PPMA in the case of Alternative B, Core Area habitat in the case of Alternative E). Alternative D would impose the fewest restrictions on future oil and gas development, after Alternative A, with buffer areas around leks and constraints on surface occupancy. Because no development of oil and gas are projected for the Study Area, no impacts of alternatives on output, employment, and earnings are expected.

Locatable minerals:

Under Alternatives A, 7 percent of the federal mineral estate decision area would remain closed for development of locatable minerals, with an additional 1 percent petitioned for withdrawal. Petitions for withdrawal require that validity exams be conducted on existing mining claims when a Notice or Plan of Operation is proposed and on notices or Plans of Operations for material changes in existing operations. This delays the start or expansion of mining operations and increases costs.

Alternatives B, E, and F would increase the federal mineral estate petitioned for withdrawal by approximately 29 percent of the federal mineral estate for locatables, in addition to the currently closed 7 percent, and Alternative C would increase the federal mineral estate petitioned for withdrawal by 63 percent, in addition to the currently closed 7 percent. Alternative D is similar to Alternative A, but it would recommend limits on surface disturbance and mitigation of impacts on Greater Sage-Grouse habitat.

No Reasonably Foreseeable Development scenario for locatable minerals was developed for this landscape level planning amendment that forecasts production of locatable minerals on Federal lands in the Study Area. In the absence of this information, it is not possible to quantify potential economic impacts across alteratives over the planning horizon. Nor is it possible to assess the extent to which development of locatiable minerals on split-estate would be affected. However, as discussed above, under Alternatives B, C, E, and F, costs could arise for validity exams for claims or operations looking to expand in areas recommended for withdrawal. In addition, no new claims could be made to explore or mine locatable minerals in withdrawn areas which could possibly impact economic activity compared to Alternatives A and D.

Salable minerals:

Under Alternative A,, approximately 18 percent of the federal mineral estate would be closed to salable minerals development. This percentage would increase to approximately 47 percent under Alternatives B, D, E, and F and to 75 percent under Alternative C. If employment were to fall proportionally to closures of federal mineral estate, the impact on salable minerals-related employment in the Study Area would be a loss of between 56 and 138 jobs under Alternatives B, D, E, and F and between 96 and 235 jobs under Alternative C. The impacts of Alternative B, D, E, F, and C could be larger due to ROW avoidance and exclusion increases in several of these alternatives relative to Alternative A. These avoidance and exclusion increases potentially affect salable minerals through increased costs of minerals development and decreased construction and derived demand for mineral materials. ROW exclusion and avoidance areas would be the greatest under Alternative C and the least under Alternatives A and E.

[..]

Relative to Alternative A, closures or restrictions to salable mineral development under Alternatives B, D, E, and F would affect locations throughout the Study Area, with large extensions in Lake, Harney and Malheur Counties. Alternative C would add closures to various locations that otherwise would remain open to salable mineral development, particularly in central and northern portions of Lake and Harney Counties.

Request:

Please inform how the proposed plan will impact oil and gas, locatable and salable minerals, relative to the impacts under other alternatives, as described above.

Data Request – Impacts of the Proposed Plan on Recreation – Oregon:

To: Stewart Allen, Christopher Knauf

Based on input provided by Christopher Knauf to Josh Sidon in May of 2014 and on review of DEIS sections, our analysis of the potential economic impacts of management alternatives on recreation is described below:

Alternative A
Existing recreation opportunities in the Study Area would be maintained. Alternative A would not result in impacts on revenue of commercial recreation service providers or managing agencies attributable to SRPs. This is because it would result in no changes to current management.

Alternatives B, D, E, and F
Overall visitation levels and the corresponding economic impact of recreation expenditures in the Study Area would not be substantially different from Alternatives A and C. However, limitations on SRPs and motorized travel restrictions could lead to some added costs to recreational users of BLM-administered lands. This could result from having to circumvent closed areas or adopting less preferred options in certain activities. These include hunting, where ATV use is prevalent for retrieving game, or other activities that make use of motorized travel. Beneficial impacts could arise from enhanced opportunities for recreation, such as backcountry camping or low-density hiking, as well as opportunities for such activities as hiking, horseback riding, and hunting in a more primitive setting. The net economic effect on recreation is not possible to quantify, and the net direction (positive or negative economic effect) is uncertain.

Alternative C
Economic impacts of Alternative C are the same as those of Alternative A. The limitations on SRPs and motorized travel restrictions of Alternatives B, D, E and F would not be implemented in Alternative C and Alternative C would result in no substantial changes to current management that could affect recreation.

Request:

Please inform how the impacts of the proposed plan on recreation will differ from those described for the other alternatives above.

Data Request – Impacts of the Proposed Plan on Wind Energy Development – Oregon:

To: Stewart Allen, Tara McLain

Based on information provided by Tara McLain and forwarded to ICF by Josh Sidon on August 19, 2013, and on review of draft sections, the socioeconomic section describes the impact of management alternatives on wind development as follows:

"Although there are many locations in the Study Area where wind development is feasible, these locations may or may not overlap with sage-grouse habitat. For the purposes of IMPLAN analysis, BLM considered that two currently existing applications for wind development in the Burns District (Harney County) would no longer occur under Alternatives B, C, and F, both projects being in PGMA, with some of the associated transmission lines and access roads in PPMA. These two projects are estimated to have, when completed, 182 MW of installed capacity. For the purposes of IMPLAN analysis only, BLM assumed that construction would be distributed over a 10-year period."

Request:

Please inform how the proposed plan would impact wind energy development relative to the impact of the other alternatives described above.

Data Request – Impacts of the Proposed Plan on Coal Development – Utah:

To: Julie Suhr Pierce

Table W.11 reflects expected coal production under the various management alternatives analyzed. The table is based on estimates provided by Julie Suhr Pierce to Josh Sidon on May 3, 2014, and forwarded to ICF.

Table W.11
Estimated Annual Average Coal Production on Federal Lands in Utah (tons), 2014-2028

	Underground	Surface	Total
Alternative A	15,291,616	1,594,667	16,886,283
Alternative B	13,150,790	0	13,150,790
Alternative C	12,080,377	0	12,080,377
Alternative D	15,291,616	1,594,667	16,886,283
Alternative E	15,291,616	1,594,667	16,886,283

For the estimation of the impacts of the alternatives on coal production, the following assumptions were made, based on information in various documents:

- 77 percent of all production is from federal mineral lands (BLM 2013b)
- New coal leases would be required for underground coal production from 2017 onwards
- BLM made the assumption for analysis purposes only that no new subsurface leasing would occur in priority habitat (for Alternative B) or occupied habitat (for Alternative C). The idea that closing GRSG habitat to new leases would effectively preclude underground coal mining represents a worst-case scenario because nothing in this alternative would preclude leasing of subsurface materials.
- The Alton coal field would generate 1,840,000 tons of coal per year starting in 2016 from surface coal mining, under Alternatives A, D and E (BLM 2011). For analytical purposes only, this coal is assumed to be produced entirely from federal lands. BLM assumed that no production would occur from the Alton coal field in Alternatives B and C, based on it being a surface mine. To the extent that some underground mining of the deposit could still occur, accessed through surrounding non-Federal lands, this assumption of no production under alternatives B and C may overstate the actual impacts of those alternatives.

Request:

Please explain how the proposed plan would affect coal production relative to Alternative A. In doing so, please feel free to use Table W.11 above or to work on the Excel spreadsheet sent by Julie to Josh on May 3, 2014, if it is easier.

Data Request – Impacts of the Proposed Plan on Grazing – Utah:

To:

BLM: Julie Suhr Pierce, Alan Bass

USFS: Chris Miller, Dustin Bambrough

Table W-1 below shows active and billed AUMs in GRSG habitat by FO and NF and by alternative. (*Note, Table W-1 was edited with respect the table in the draft EIS to make the data shown for BLM consistent with what we show for USFS – i.e., only AUMs in GRSG habitat*).

Table W. 1
Estimated Annual Animal Unit Months on Federal Lands, 2011

	Active			Billed		
	Alternative A, B, D and E	Alternative C1	Alternative C2	Alternative A, B, D and E	Alternative C1	Alternative C2
Cedar City FO	73,587	0	44,152	46,543	0	27,926
Fillmore FO	27,181	0	16,309	16,177	0	9,706
GSENM	1,920	0	1,152	961	0	577
Kanab FO	8,991	0	5,395	4,421	0	2,653
Moab FO	0	0	0	0	0	0
Price FO	12,845	0	7,707	6,582	0	3,949
Richfield FO	15,430	0	9,258	10,401	0	6,241
Salt Lake FO	98,028	0	58,817	76,515	0	45,909
Vernal FO	91,689	0	55,013	46,947	0	28,168
Sawtooth NF	12,348	0	7,409	12,348	0	7,409
Dixie NF	38,843	0	23,306	38,843	0	23,306
Fishlake NF	69,707	0	41,824	69,707	0	41,824
Manti-Lasal NF	55,561	0	33,337	55,561	0	33,337
Uinta-Wasatch-Cache NF	44,441	0	26,665	44,441	0	26,665
Ashley NF	43,329	0	25,997	43,329	0	25,997
Total	593,900	0	356,341	472,777	0	283,667

Data Sources:

- BLM data:
    1. Active AUMs from RAS as of August of 2012, sent by Josh Sidon on 08/07/2012. The data is in file titled "<u>count_term_auths_AUMs_2012-8-3.xlsx</u>."
    2. Billed AUMs from RAS over 20 years (to 2012), sent by Josh Sidon on 08/07/2012. The data is in file titled "<u>National_20_Years_Bills_2012-8-1.xlsx</u>."
    3. Loss of active and billed AUMs under Alternative C1 based on information provided by Alan Bass on 05/09/2103 to Josh Sidon in file titled "<u>Sage Grouse allotment se by field office and state</u>." Estimates for Active and Billed AUMs for Alternative C2 assume 60

percent of the AUMs made unavailable under Alternative C1 are made unavailable under Alternative C2

- USFS data:
    1. Active ("permitted") AUMs come from data provided by Dustin Bambrough on April 01, 2013, in file called "*UT_LivestockGrazing_AreaTotals_03_06_2013*." Data corresponds only to AUMs in portion of NFs within the study area and with sage-grouse habitat.
    2. Distribution of active AUMs among cattle, sheep and other, from data sent by Chris Miller on 02/06/2013 in file titled "miller_request_authorizedAUMs.xls."
    3. Billed (authorized) as a share of active (permitted) we agreed to use 100%.
    4. Loss of active and billed AUMs under Alternative C1 is all of those shown for Alternative A, because numbers for FS were already restricted to AUMs in GRSG habitat. Estimates for Active and Billed AUMs for Alternative C2 assume 60 percent of the AUMs made unavailable under Alternative C1 are made unavailable under Alternative C2.

Request:

1. **Please provide expected reduction in active AUMs in the revised Proposed Plan relative to Alternative A.**
2. **Please discuss any additional costs on livestock operators imposed by the Proposed Plan (e.g. fencing, seasonal changes, restrictions on disturbance) and how these compare to the remaining alternatives.**

Data Request – Impacts of the Proposed Plan on Land and Realty and Travel Management – Utah:

To: Julie Suhr Pierce, David Jeppesen, Chris Miller (FS), David Reis (FS)

Based on review of land and realty and travel management sections and management alternatives, the socioeconomic section currently states the following:

> "To the extent that management alternatives require linear construction projects to avoid GRSG habitat or imposes additional construction requirements and constraints for projects crossing GRSG habitat, some impacts could affect the general public. Alternatives B, C and D would impose new ROW exclusions and reduction or alteration of designated corridor areas. The magnitude of this potential impact, in terms of miles of linear projects or total construction costs, could not be quantified since details of future linear projects are not known."

Request:

Please inform how the impacts of the proposed plan on land and realty and travel management compare with those described above.

Data Request – Impacts of the Proposed Plan on Locatable and Salable Minerals – Utah:

To: Julie Suhr Pierce, Jefferson McKenzie

Based on input provided by Jefferson McKenzie to Josh Sidon and forwarded to ICF on April 15, 2014 (copying Julie Suhr Pierce), and on review of DEIS sections, our main conclusions on the potential economic impacts of management alternatives on salable and locatable minerals are described below.

Locatable:

Although, potential impacts to locatable mineral development are expected to be minimal (in terms of relative production and economic activity) across all alternatives, the potential impacts do differ across alternatives. In particular, alternatives B and C recommend withdrawal from mineral entry in PPMA and mapped occupied habitat, respectively. The implications of these potential withdraws are explained in detail in Section 4.20.4. Generally, these withdraws could affect a subset or all of the 39 locatable mining operations that occur on BLM or USFS lands in GRSG occupied habitat as well as the claimants holding one of the over 2,500 claims. Any material changes to existing operations within a withdrawn area would require a validity examination. The claims would also be subject to a validity examination to determine if the claim is valid and prior to any development of the claim. Validity examinations typically cost at least $50,000 to complete and have the potential to delay the start of a locatable mineral development. In all the action alternatives where GRGS habitat would remain open, the BLM and USFS would work with claimants, to the extent possible by law, to minimize impacts to GRSG habitat which could increase costs to the claimant.

Salable:

Areas closed to mineral materials disposal would be the most under Alternative C, where no federal mineral estate within the decision area would remain open to mineral material disposal, and the least under alternatives A and E, under which 98 percent of the federal mineral estate within the decision area would remain open. There are 4,008,600 acres of federal mineral estate in the decision area. Under Alternative D, 74 percent of federal mineral estate would be closed to commercial disposal and an additional 9 percent would be closed to both commercial and noncommercial disposal.

Request:

Please inform how the impacts of the proposed plan on locatable and salable minerals compare to the descriptions above.

Data Request – Impacts of the Proposed Plan on Oil and Gas Development – Utah:

To: Julie Suhr Pierce, Tyler Ashcroft

Tables W.4 and W.5 reflect expected oil and gas wells drilled and completed and oil and gas production under the various management alternatives analyzed. The table is based on RFD provided by Tyler Ashcroft on June 18, 2014 and include information for a draft proposed plan.

Table W.4, Oil and Gas Well Numbers, presents the total number of wells drilled and completed in the Primary Socioeconomic Study Area for each alternative, relative to Alternative A.

Table W. 4
Oil and Gas Well Numbers in New and Existing Leases, Relative to Alternative A

Item	***Federal, State, and Fee Surface***	***Federal Surface***		***State and Fee Surface***
		New Leases	***Existing Leases***	
Alternative B – Wells Drilled	-329	-115	-165	-49
Alternative B – Wells Completed	-242	-93	-126	-23
Alternative C – Wells Drilled	-858	-270	-494	-94
Alternative C – Wells Completed	-670	-217	-397	-56
Alternative D – Wells Drilled	-223	-40	-165	-18
Alternative D – Wells Completed	-166	-31	-126	-9
Alternative E – Wells Drilled	0	0	0	0
Alternative E – Wells Completed	0	0	0	0
Proposed Plan – Wells Drilled	-228	-44	-165	-19
Proposed Plan – Wells Completed	-167	-35	-126	-6

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information

The production per well was assumed based on the typical production of existing wells in the area, or 1,471 MMCF per gas well and 200 MBO per oil well over a 20 year well life. Each well was assumed to have a 20-year life and 75 percent of its lifetime production would be reached during the 15-year period. The production that would be affected by each alternative is proportional to the share of wells affected by GRSG habitat, as appropriate for each alternative. Reductions in drilled and completed wells relative to Alternative A correspond to approximately 7 percent under alternative D and the Proposed Plan, 10 percent under Alternative B and 27 percent under Alternative C, with no reduction under Alternative E. **Table W.5**, Projected Oil and Gas Production, 15-Year Period, presents the projected quantity of oil and gas over the 15-year forecast period on federal surface and on federal, state, and fee surface.

Table W. 5
Projected Oil (MBO) and Gas (MMCF) Production in New and Existing Leases, Relative to Alternative A, 15-Year period

Item	*Federal, State, and Fee Surface*	*Federal Surface*	*State and Fee Surface*
Alternative B – Gas (MMCF)	-113,083	-101,628	-11,455
Alternative B – Oil (MBO)	-2,775	-2,580	-195
Alternative C – Gas (MMCF)	-302,842	-277,417	-25,425
Alternative C – Oil (MBO)	-9,075	-8,366	-709
Alternative D – Gas (MMCF)	-77,228	-72,791	-4,436
Alternative D – Oil (MBO)	-1,950	-1,909	-41
Alternative E – Gas (MMCF)	0	0	0
Alternative E – Oil (MBO)	0	0	0
Proposed Plan – Gas (MMCF)	-78,882	-75,183	-3,699
Proposed Plan – Oil (MBO)	-1,800	-1,827	27

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information.
MMCF = million cubic feet; MBO = thousand barrels

Request:

Please confirm that the impact of the proposed plan on oil and gas production is still correctly reflected in Tables W.4 and W.5, or please correct as appropriate.

Data Request – Impacts of the Proposed Plan on Phosphate – Utah:

To: Julie Suhr Pierce, Tyler Ashcroft

The current draft of the socioeconomics section discusses the potential impacts of management alternatives on phosphate production based on information provided by Tyler Ashcroft on April 17, 2014 and review of the minerals section. The socioeconomics section states the following:

"No Reasonably Foreseeably Development scenario for phosphate exists that quantifies current phosphate reserves on private and public lands and forecasts production of those reserves. In the absence of this information and any proposed plans for leasing and developing Federal lands for phosphate, it is not possible to quantify potential economic impacts across alternatives over the planning horizon. However, the areas available for phosphate leasing vary by alternative and could result in economic impacts if any party does pursue phosphate leasing and development of federal minerals. These impacts would be more likely under Alternative C that would close all federal mineral estate with phosphate potential to new leases, followed closely by Alternative B that would close 83 percent of the federal mineral estate decision area. Alternative A and E would close the fewest acres. Alternative D would close most areas to surface mining but mostly allow underground mining (Section 4.30.2)."

Request:

Please inform how the proposed plan compares to the remaining alternatives on open and closed federal mineral estate for leasing.

Data Request – Impacts of the Proposed Plan on Recreation – Utah:

To: Julie Suhr Pierce, David Jeppesen, Chris Miller (FS), David Reis (FS)

Based on input provided by David Jeppesen and forwarded by Tyler Ashcroft on April 15, 2015 and on input provided by David Reis (FS) and forwarded by Chris Miller (FS) on June 16, 2014, our analysis of the potential economic impacts of management alternatives on recreation is described below.

> "Quantifying or predicting changes in recreation use is more likely to be feasible for highly developed recreation areas. Quantifying or predicting changes in recreation in GRSG habitat in Utah is more difficult because primary recreational uses in GRSG habitat are more likely to be dispersed uses, such as hunting, driving for pleasure, general OHV use, car camping, and rock hounding. Baseline information on dispersed recreation within habitat areas is not available and thus precludes the quantification of potential changes to recreation use associated with management alternatives. In addition, the management actions considered within the range of alternatives potentially affecting recreation and travel management would not meaningfully affect how the public participates in the forms of dispersed recreation mentioned above because the majority of areas that would be closed to recreation activities such as OHV travel currently do not have mapped routes. In regards to access, recreation uses that rely on traveling cross country in or on a motorized vehicle would no longer be allowed within priority habitat. Action alternatives include measures that move BLM and FS lands designated as "Open" to cross country travel, to "Limited" to existing/designated routes within priority habitat. This change allows the BLM, FS, and the state of Utah to mitigate habitat destruction by prosecuting those who drive cross country."

Request:

Please inform whether the proposed plan would impact recreation differently from what is described above or feel free to suggest added language relative to the proposed plan.

Data Request – Impacts of the Proposed Plan on Wind Energy Development – Utah:

To: Julie Suhr Pierce, James Gazewood

Based on information provided by James Gazewood to Josh Sidon and forwarded to ICF on April 26, 2014 and review of the DEIS renewable energy section, the socioeconomics analysis assumed the following acres of BLM RFD Wind Energy within sage-grouse population areas that would be unaffected by this planning effort:

Alt. A = 17,328 acres (or 210 MW) within Hamlin and Bald Hills Areas

Alt. B = 9,998 acres (121 MW) within Hamlin Occupied Habitat (Bald Hills occupied did not touch WE RFD)

Alt. C = 9,998 acres (121 MW) within Hamlin Occupied Habitat (Bald Hills occupied did not touch WE RFD)

Alt. D = 9,998 acres (121 MW) within Hamlin Occupied Habitat (Bald Hills occupied did not touch WE RFD)

Alt. E = 17,328 acres (or 210 MW) within Hamlin and Bald Hills Areas

Request:

Please inform how the open areas to wind energy development within sage-grouse habitat under the proposed plan would compare to the remaining alternatives.

From: Uriarte, Alex [Alex.Uriarte@icfi.com]
Sent: Wednesday, October 1, 2014 8:14 AM
To: Sidon, Joshua B (jsidon@blm.gov)
CC: ICF_SGSE
Subject: BLM SGSE - Touching base
Attachments: summary oil and gas_v7.xlsx

Hi, Josh,

We haven't communicated in a couple of weeks. I calculated the cumulative oil and gas impacts of the GRSG management alternatives across the 10 state sage-grouse range as a share of projected oil and gas production for the 10 states, as we had discussed. I used EIA projections for the lower 48 states as a whole, since projections were not available by state. The results are only slightly lower than what we had before (see first tab of attached spreadsheet). If production were expected to grow much more in the 10 states than in the 48 as a whole, the result could be different, but I don't think we have those projections (at least I couldn't find any on the websites of the WOGCC and the COGCC).

Let me know if you want to touch base. Any news on schedule? Any news on the information we were seeking on the proposed plans? Do you think it would be useful for me to try to pursue some of the information we need on the proposed plans directly with other resource specialists, maybe copying you?

Please let me know.

Thanks,

Alex

ALEX URIARTE | Technical Specialist | 703.218.2587 | alex.uriarte@icfi.com | icfi.com
ICF INTERNATIONAL | 9300 Lee Highway, Fairfax, VA 22031 | 703.934.3000
Connect with us on social media.

Most Restrictive Alternative Impact

	Oil Production (MBO, Thousands Barrels of Oil)
Total impact	(11,959)
Oil and Gas production in 2012 in the 10 states	607,074
Cumulative Impact	**-2.0%**
Oil and Gas production projected to Avg 2015-2034[a]	676,323
Cumulative Impact	**-1.8%**

a. Based on EIA reference case projections for lower 48 onshore oil production (for oil projections) and lo

Alternative D Impact

Total impact	(1,794)
Oil and Gas production in 2012 in the 10 states	607,074
Cumulative Impact	**-0.3%**
Oil and Gas production projected to	676,323
Cumulative Impact	**0.0**

a. Based on EIA reference case projections for lower 48 onshore oil production (for oil projections) and lo

Gas Production (BCF, Billion Cubic Feet)		Source
(649)		
4,715		http://www.eia.gov/dnav/ng/ng_prod_
-13.8%		
5,534		http://www.eia.gov/forecasts/archive/
-11.7%		

wer 48 onshore gas production (for gas projections). See tab "EIA Projections." Assumes prc

		Source
(90)		
4,715		http://www.eia.gov/dnav/ng/ng_prod_
-1.9%		
5,534		http://www.eia.gov/forecasts/archive/
0.0		

wer 48 onshore gas production (for gas projections). See tab "EIA Projections." Assumes prc _sum_a_epg0_vgm_mmcf_a.htm, http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm

aeo13/source_oil.cfm

duction in 10 states would grow at same rate as that projected for the lower 48 states as a whole

_sum_a_epg0_vgm_mmcf_a.htm, http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm

aeo13/source_oil.cfm

duction in 10 states would grow at same rate as that projected for the lower 48 states as a whole

Most Restrictive Alternative

	Oil Production (MBO, Thousands Barrels of Oil)			Gas Productio (BCF, Billion Cubic	
	Alt. A	Most Restrictive Alt.	Impact	Alt. A	Most Restrictive Alt.
CA/NV	1,000	0	(1,000)	n/a	n/a
OR	n/a	n/a	n/a	n/a	n/a
ID/MT	n/a	n/a	n/a	n/a	n/a
UT	2280	1675	(605)	73.6	53.4
NWCO	3,960	2,847	(1,113)	2,656	2,243
Hi Line RMP	140	128	(13)	21	7
Lewistown	n/a	n/a	n/a	n/a	n/a
Billings/Pompey's Pillar	n/a	n/a	n/a	n/a	n/a
Miles City RMP	5,955	5,825	(130)	8	8
WY (9-Plan)	9,076	6,583	(2,493)	729	613
Lander	3,700	3,100	(600)	340	279
Big Horn	6,400	4,000	(2,400)	13	8
Buffalo	6,900	3,500	(3,400)	96	77
ND	58	25	(34)	0.009	0.004
SD	419	247	(171)	4	2
Total impact			(11,959)		
Oil and Gas production in 2012 in the 10 states			607,074		
Cumulative Impact			-2.0%		

Based on Annual Averages

Alternative D

	Oil Production (MBO, Thousands Barrels of Oil)			Gas Productio (BCF, Billion Cubic	
	Alt. A	Alt. D	Impact	Alt. A	Alt D
CA/NV	1,000	600	(400)	n/a	n/a
OR	n/a	n/a	n/a	n/a	n/a
ID/MT	n/a	n/a	n/a	n/a	n/a
UT	2280	2150	(130)	73.6	68.4
NWCO	3,960	3,646	(314)	2,656	2,585
Hi Line RMP	140	140	(0)	21	22
Lewistown	n/a	n/a	n/a	n/a	n/a
Billings/Pompey's Pillar	n/a	n/a	n/a	n/a	n/a
Miles City RMP	5,955	5,968	13	8	8
WY (9-Plan)	9,076	8,873	(203)	729	718
Lander	3,700	3,500	(200)	340	314
Big Horn	6,400	6,100	(300)	13	12
Buffalo	6,900	6,800	(100)	96	120
ND	58	50	(8)	0.009	0.008
SD	419	267	(152)	4	2
Total impact			(1,794)		

Oil and Gas production in 2012 in the 10 states	607,074	
Cumulative Impact	-0.3%	

Based on Annual Averages

Feet)	Alt. Used	Source	Notes
Impact			
n/a	B		
n/a			
n/a			
(20)	C		
(413)	C		
(14)	B	MT oil and gas production	Not just GRSG impact
n/a		MT oil and gas production	
n/a		MT oil and gas production	
(0.1)	B	MT oil and gas production	Not just GRSG impact
(116)	C	OGProdTablesState_v2	
(61)	B	Draft Supplement EIS	Not just GRSG impact
(4.9)	B	Draft Supplement EIS	Not just GRSG impact
(18.3)	B	Draft Supplement EIS	Not just GRSG impact
(0.01)	C	MT oil and gas production	
(2)	C	MT oil and gas production	
(649)			
4,715		http://www.eia.gov/dnav/ng/ng_prod_sum_a_epg0_vgm_mmcf	
-13.8%			

Feet)	Alt. Used	Source	Notes
Impact			
n/a	D		
n/a			
n/a			
(5)	D		
(71)	D		
1	D	MT oil and gas production	Not just GRSG impact
n/a		MT oil and gas production	
n/a		MT oil and gas production	
0.0	D	MT oil and gas production	Not just GRSG impact
(11)	D	OGProdTablesState_v2	
(26)	D	Draft Supplement EIS	Not just GRSG impact
(0.6)	D	Draft Supplement EIS	Not just GRSG impact
24.9	D	Draft Supplement EIS	Not just GRSG impact
(0.00)	D	MT oil and gas production	
(1)	D	MT oil and gas production	
(90)			

4,715	
-1.9%	

http://www.eia.gov/dnav/ng/ng_prod_sum_a_epg0_vgm_mmcf _a.htm, http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm _a.htm, http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm

Federal Lands Only (over 20 years)

	All production		Non PPH		Non
	Gas (MMCF)	Oil (MBO)	Gas (MMCF)	Oil (MBO)	Gas (MMCF)
GJFO	12,368,380	1,811	10,463,649	1,532	7,863,816
WRFO	4,125,650	4,126	3,788,584	3,789	2,920,960
LSFO	1,331,000	26,621	760,800	15,217	419,132
KFO	0	622	0	95	0
CRVFO	5,798,830	5,799	5,789,552	5,790	5,769,256
Roan Plateau	3,736,000	3,736	3,736,000	3,736	2,132,135
Total	27,359,860	42,714	24,538,585	30,158	19,105,299
	1367993	2135.71			

Federal, State and Private Lands (over 20 years)

	All production	
	Gas (MMCF)	Oil (MBO)
GJFO	23,843,450	5,684
WRFO	5,019,540	5,020
LSFO	2,268,300	45,368
KFO	0	1,155
CRVFO	15,585,790	15,586
Roan Plateau	6,394,760	6,395
Total	53,111,840	79,208

ADH	PPH		ADH	
Oil (MBO)	Gas (MMCF)	Oil (MBO)	Gas (MMCF)	Oil (MBO)
1,151	1,904,731	279	4,504,564	659
2,921	337,066	337	1,204,690	1,205
8,383	570,200	11,404	911,868	18,238
85	0	527	0	537
5,769	9,278	9	29,574	30
2,132	0	0	1,603,865	1,604
20,442	2,821,275	12,557	8,254,561	22,272

	Alt A		AltB		AltC	
	Gas (MMCF)	Oil (MBO)	Gas (MMCF)	Oil (MBO)	Gas (MMCF)	Oil (MBO)
GJFO	23,843,450	5,684	21,938,719	5,405	19,338,886	5,025
WRFO	5,019,540	5,020	4,682,474	4,682	3,814,850	3,815
LSFO	2,268,300	45,368	1,698,100	33,964	1,356,432	27,130
KFO	0	1,155	0	628	0	619
CRVFO	15,585,790	15,586	15,576,512	15,577	15,556,216	15,556
Roan Plateau	6,394,760	6,395	6,394,760	6,395	4,790,895	4,791
Total	53,111,840	79,208	50,290,565	66,651	44,857,279	56,935
	2,655,592	3,960	2,514,528	3,333	2,242,864	2,847
					412,728	1,114

AltD	
Gas (MMCF)	Oil (MBO)
22,891,085	5,545
4,851,007	4,851
1,983,200	39,666
0	892
15,581,151	15,581
6,394,760	6,395
51,701,203	72,929
2,585,060	3,646
70,532	314

Production over 15 years

	Altenative A		Altenative B		Altenative C
	Gas (MMCF)	Oil (MBO)	Gas (MMCF)	Oil (MBO)	Gas (MMCF)
Total	1,103,250	34,200	990,167	31,425	800,408
Federal	874,810	27,119	773,182	24,539	597,393
Annual Average	73,550	2,280	66,011	2,095	53,361

	Altenative D		Altenative E		Proposed Plan
Oil (MBO)	Gas (MMCF)	Oil (MBO)	Gas (MMCF)	Oil (MBO)	Gas (MMCF)
25,125	1,026,023	32,250	1,103,250	34,200	1,024,368
18,752	802,019	25,209	874,810	27,119	799,627
1,675	68,402	2,150	73,550	2,280	68,291

Oil (MBO)
32,400
25,292
2,160

Alt A	Existing and new leases		
Area	**Wells drilled**	**Wells completed**	**Production (oil, bbls) per well**
Great Basin Core	60	12	1,000,000
NW Interior NV	0	0	200,000
Warm Springs			200,000
Quinn Range NV	40	8	1,000,000
Sum			

Alt B	Existing and new leases		
Area	**Wells drilled**	**Wells completed**	**Production (oil, bbls) per well**
Great Basin Core	0	0	1,000,000
NW Interior NV	0	0	200,000
Warm Springs			200,000
Quinn Range NV	0	0	1,000,000
Sum			

Alt D	New leases	New leases	
Area	**Wells drilled**	**Wells completed**	**Production (oil, bbls) per well**
Great Basin Core	30	6	1,000,000
NW Interior NV	0	0	200,000
Warm Springs			200,000
Quinn Range NV	30	6	1,000,000
Sum			

Prodn total	
12,000,000	
0	
0	
8,000,000	Avg
20,000,000	1,000,000

Prodn total	
0	
0	
0	
0	Avg
0	0

Prodn total	
6,000,000	
0	
0	
6,000,000	Avg
12,000,000	600,000

Oil and Gas Production Economic Impact - State Annual (2013-2020)

Alternative A

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	320,421,160	3,927,409	$1,647,556,500	$1,860,063,410	1,616.2	$118,342,747
2014	495,171,477	6,138,634	$2,551,986,946	$2,883,986,598	2,540.6	$185,840,555
2015	611,052,882	7,633,737	$3,154,184,424	$3,567,792,645	3,183.6	$232,681,676
2016	710,030,510	8,853,083	$3,663,637,186	$4,147,789,700	3,743.7	$273,409,217
2017	803,320,471	9,990,785	$4,142,830,634	$4,694,216,327	4,278.0	$312,117,006
2018	885,333,018	11,020,593	$4,566,615,767	$5,178,841,633	4,766.1	$347,330,200
2019	965,754,773	12,041,475	$4,983,119,939	$5,655,634,723	5,251.9	$382,317,320
2020	1,038,000,236	12,998,370	$5,360,662,386	$6,088,525,030	5,699.5	$414,459,697
Total	5,829,084,527	72,604,085	$30,070,593,782	$34,076,850,066	31,079.6	$2,266,498,419
NPV			$25,828,281,449	$29,265,970,924		$1,944,081,386

Alternative B

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	324,096,840	3,741,968	$1,646,864,337	$1,857,613,169	1,586.2	$116,150,754
2014	498,471,447	5,772,147	$2,534,365,425	$2,860,933,309	2,470.2	$180,762,844
2015	608,781,830	6,953,057	$3,087,015,381	$3,487,718,707	3,041.5	$222,397,339
2016	702,339,804	7,908,199	$3,551,790,115	$4,015,974,521	3,532.9	$258,138,007
2017	792,002,796	8,915,742	$4,005,049,565	$4,532,279,208	4,027.6	$294,020,100
2018	862,086,150	9,721,843	$4,360,909,885	$4,939,625,954	4,438.4	$323,639,262
2019	934,532,986	10,691,691	$4,740,379,008	$5,374,052,672	4,881.7	$355,571,043
2020	995,119,910	11,526,682	$5,059,759,634	$5,740,867,939	5,268.0	$383,275,862
Total	5,717,431,763	65,231,331	$28,986,133,349	$32,809,065,479	29,246.4	$2,133,955,210
NPV			$24,924,123,009	$28,208,043,598		$1,832,371,794

Alternative C

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	294,129,811	3,273,957	$1,484,218,577	$1,672,904,365	1,410.2	$103,301,862
2014	449,687,220	4,944,467	$2,263,997,314	$2,553,347,411	2,171.4	$159,039,731
2015	540,571,647	5,671,968	$2,698,461,006	$3,045,425,315	2,608.7	$191,073,768
2016	616,652,653	6,460,376	$3,077,407,870	$3,475,454,601	3,004.4	$219,964,543
2017	679,808,129	7,214,625	$3,400,456,485	$3,842,246,885	3,349.5	$245,191,157
2018	723,568,182	7,786,501	$3,628,482,089	$4,102,914,549	3,615.5	$264,425,371

2019	773,638,150	8,375,598	$3,883,842,208	$4,394,568,231	3,906.4	$285,454,047
2020	822,655,907	8,932,525	$4,132,153,864	$4,678,424,636	4,189.9	$305,914,049
Total	4,900,711,699	52,660,017	$24,569,019,415	$27,765,285,992	24,256.0	$1,774,364,526
NPV			$21,170,674,443	$23,922,705,784		$1,527,046,250

Alternative D

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	317,858,919	3,897,232	$1,634,486,283	$1,845,318,081	1,603.2	$117,378,941
2014	491,485,409	6,085,907	$2,532,392,245	$2,861,897,344	2,521.2	$184,397,516
2015	606,677,815	7,551,910	$3,129,291,379	$3,539,516,065	3,155.5	$230,602,679
2016	704,494,252	8,689,291	$3,627,016,154	$4,106,020,338	3,698.6	$270,095,459
2017	797,109,158	9,786,204	$4,099,974,884	$4,645,268,316	4,223.8	$308,144,173
2018	870,212,092	10,739,679	$4,480,742,260	$5,081,480,546	4,672.0	$340,420,221
2019	945,782,092	11,684,696	$4,870,905,767	$5,528,543,168	5,131.5	$373,495,035
2020	1,010,395,298	12,552,468	$5,209,580,484	$5,917,657,888	5,542.3	$402,932,197
Total	5,744,015,034	70,987,386	$29,584,389,456	$33,525,701,748	30,548.2	$2,227,466,220
NPV			$25,422,412,762	$28,805,862,692		$1,911,451,401

Alternative E

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	318,724,940	3,801,664	$1,629,913,672	$1,839,581,696	1,586.7	$116,136,294
2014	492,703,954	5,902,813	$2,521,825,349	$2,848,914,850	2,488.7	$181,952,164
2015	604,505,705	7,265,393	$3,096,031,788	$3,500,343,613	3,091.4	$225,842,833
2016	698,316,896	8,249,909	$3,564,341,513	$4,032,810,859	3,592.2	$262,287,145
2017	787,612,542	9,347,281	$4,023,730,334	$4,556,503,496	4,103.3	$299,376,138
2018	857,779,351	10,266,540	$4,389,551,242	$4,975,460,959	4,532.9	$330,339,916
2019	931,096,889	11,175,941	$4,767,452,261	$5,408,347,042	4,976.9	$362,342,285
2020	993,733,861	12,012,924	$5,095,407,362	$5,784,951,670	5,372.6	$390,737,630
Total	5,684,474,137	68,022,465	$29,088,253,521	$32,946,914,186	29,744.7	$2,169,014,404
NPV			$25,005,503,432	$28,319,313,111		$1,861,946,259

FMR	Ad Valorem	Severance			
$100,684,484	$79,649,863	$76,572,824			
$155,909,686	$123,422,288	$118,643,161			
$192,649,835	$152,587,289	$146,669,519			
$223,706,336	$177,220,710	$170,350,313			
$252,858,571	$200,382,930	$192,618,649			
$278,573,038	$220,887,673	$212,327,325			
$303,840,247	$241,047,810	$231,703,019			
$326,735,441	$259,349,686	$249,286,455			-116,046,604
$1,834,957,637	$1,454,548,248	$1,398,171,265			
$1,576,170,287	$1,249,333,587	$1,200,912,658			

			5,829,084,527	72,604,085	
			728,635,566	9,075,511	
FMR	Ad Valorem	Severance	728,636	9,076	
$100,646,984	$79,455,352	$76,422,645			
$154,852,939	$122,286,059	$117,615,826			
$188,584,815	$148,883,904	$143,213,482			
$216,928,393	$171,219,211	$164,716,534			116,047
$244,512,617	$193,067,791	$185,735,667			
$266,089,413	$210,234,616	$202,247,754			
$289,101,295	$228,636,962	$219,926,103			
$308,455,490	$244,141,719	$234,817,124			
			4,900,711,699	52,660,017	
$1,769,171,945	$1,397,925,614	$1,344,695,135	612,588,962	6,582,502	
$1,521,326,999	$1,202,024,026	$1,156,253,451	612,589	6,583	

FMR	Ad Valorem	Severance
$90,713,584	$71,522,003	$68,811,863
$138,365,222	$109,054,804	$104,932,416
$164,921,471	$129,788,587	$124,926,942
$188,059,410	$148,007,788	$142,465,317
$207,785,917	$163,611,458	$157,469,356
$221,660,098	$174,659,991	$168,085,390

$237,184,077	$186,987,985	$179,941,059
$252,262,587	$198,961,761	$191,459,273
$1,500,952,365	$1,182,594,377	$1,138,091,617
$1,293,374,366	$1,019,019,664	$980,672,522

FMR	Ad Valorem	Severance			
$99,882,883	$79,018,851	$75,965,994			
$154,707,756	$122,469,724	$117,728,602			
$191,124,604	$151,364,149	$145,498,136			
$221,468,958	$175,383,263	$168,599,175			
$250,241,652	$198,221,353	$190,561,095			
$273,319,559	$216,669,403	$208,287,282			
$296,977,337	$235,544,664	$226,430,357			
$317,493,969	$251,970,602	$242,209,618			-10,633,687
			5,744,015,034	70,987,386	
$1,805,216,718	$1,430,642,010	$1,375,280,259	718,001,879	8,873,423	
$1,551,342,857	$1,229,374,170	$1,181,801,584	718,002	8,873	

FMR	Ad Valorem	Severance
$99,599,398	$78,723,601	$75,699,110
$154,054,593	$121,820,511	$117,136,100
$189,086,615	$149,574,649	$143,819,281
$217,647,636	$172,099,208	$165,500,077
$245,604,579	$194,310,018	$186,852,379
$267,780,734	$212,036,731	$203,884,813
$290,700,951	$230,313,576	$221,453,870
$310,574,025	$246,216,694	$236,731,558
$1,775,048,530	$1,405,094,988	$1,351,077,188
$1,525,987,112	$1,207,870,803	$1,161,437,145

-2,493,008

2,493

-202,087

Big Horn, average annual

	Alternative A		Alternative B		Alternative D	
	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO	Gas (BCF)	Oil (MMBO)
2009	16.6	10.0	10.3	6.2	15.8	9.5
	16.2	9.5	10.0	5.9	15.4	9.0
	15.7	9.0	9.7	5.6	14.9	8.6
	15.2	8.6	9.4	5.3	14.5	8.1
	14.8	8.1	9.2	5.0	14.1	7.7
	14.4	7.7	8.9	4.8	13.7	7.3
	14.0	7.3	8.7	4.5	13.3	7.0
	13.6	7.0	8.4	4.3	12.9	6.6
	13.2	6.6	8.2	4.1	12.5	6.3
	12.8	6.3	7.9	3.9	12.2	6.0
	12.4	6.0	7.7	3.7	11.8	5.7
	12.1	5.7	7.5	3.5	11.5	5.4
	11.7	5.4	7.3	3.3	11.1	5.1
	11.4	5.1	7.1	3.2	10.8	4.9
	11.1	4.9	6.9	3.0	10.5	4.6
	10.7	4.6	6.7	2.9	10.2	4.4
	10.4	4.4	6.5	2.7	9.9	4.2
	10.1	4.2	6.3	2.6	9.6	4.0
	9.8	4.0	6.1	2.4	9.4	3.8
2028	9.6	3.8	5.9	2.3	9.1	3.6
Average	12.8	6.4	7.9	4.0	12.2	6.1

Buffalo, average annual

	Alternative A		Alternative B		Alternative D	
	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO	Gas (BCF)	Oil (MMBO)
2009	2.9	0.4	2.1	0.2	3.4	0.4
	10.9	1.0	8.5	0.5	13.5	1.0
	28.0	1.8	22.7	0.9	35.3	1.8
	45.9	2.3	37.8	1.1	58.4	2.2
	51.7	2.2	43.0	1.1	66.2	2.1
	55.1	3.1	45.1	1.6	69.8	3.1
	56.5	3.6	45.9	1.8	71.3	3.5
	62.7	4.8	50.2	2.4	78.5	4.7
	67.3	4.9	54.2	2.5	84.5	4.8
	77.4	6.3	61.7	3.2	96.6	6.2
	87.7	7.1	70.0	3.6	109.5	7.0
	101.0	8.0	80.7	4.1	126.2	7.9
	117.3	8.5	94.4	4.3	147.2	8.4
	135.3	9.8	108.9	5.0	169.8	9.7
	151.2	10.6	122.0	5.4	190.0	10.4
	165.6	11.7	133.5	6.0	208.0	11.6
	173.8	12.2	140.3	6.2	218.6	12.0
	179.5	13.1	144.4	6.7	225.3	12.9
	177.8	13.2	142.9	6.7	223.0	13.0
2028	171.2	14.0	136.6	7.1	213.8	13.8
Average	95.9	6.9	77.2	3.5	120.4	6.8

Lander, average annual

	Alternative A		Alternative B		Alternative D	
	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO	Gas (BCF)	Oil (MMBO)
2008	194.4	3.3	162.6	2.7	185.7	3.1
	217.7	3.3	182.1	2.8	208.0	3.1
	226.3	3.3	189.2	2.8	216.1	3.2
	227.8	3.4	190.5	2.8	217.6	3.2
	243.6	3.4	203.7	2.8	232.7	3.2
	266.4	3.4	222.8	2.9	254.5	3.3
	270.7	3.7	226.3	3.1	258.6	3.6
	288.8	3.5	241.5	2.9	275.9	3.4
	321.7	3.6	269.0	3.0	307.3	3.5
	314.1	3.5	262.7	2.9	300.1	3.3
	325.4	3.2	272.1	2.7	310.9	3.1
	359.7	3.6	300.8	3.0	343.7	3.4
	376.4	3.8	314.7	3.1	359.6	3.6
	398.9	3.9	333.6	3.3	281.1	3.7
	405.0	3.8	338.7	3.2	386.9	3.6
	414.0	4.1	346.2	3.4	395.5	3.9
	441.9	3.9	369.5	3.3	422.1	3.8
	451.0	4.0	377.1	3.4	430.8	3.8
	467.4	4.0	390.9	3.4	446.6	3.9
2027	469.5	4.3	392.6	3.6	448.5	4.1
Average	334.0	3.7	279.3	3.1	314.1	3.5

Annual average O&G production for MT, ND, SD plans

	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	140,058	140,058	127,515	127,515
annual gas production (MCF)	21,408,854	21,408,854	7,103,972	7,103,972
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

Source of revised numbers: Production by alternative included in updated RFD pro

Theme Conservation

	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	478,000	5,955,000	34,164	5,824,737
annual gas production (MCF)	795,000	7,962,105	57,000	7,816,842
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

Source of revised numbers: Production estimated as total # of active BLM wells (e

Theme (GRSG in all alternatives) Conservation

				Billings
	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	~~429,628~~	~~429,628~~	~~322,140~~	~~322,140~~
annual gas production (MCF)	~~221,418~~	~~221,418~~	~~166,022~~	~~166,022~~
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

Source of revised numbers: per Ruth Miller RFD for fluid minerals is not changing

				South Dak
	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	239,856	418,709	191,374	340,997
annual gas production (MCF)	280,514	3,876,915	223,814	3,157,360
cbng production (have # of wells)				

Note: production is related to all mgmt actions/constrictions, not just sage-grouse

GRSG in all alternatives; D is preferred

Source of revised numbers: Obtained from Russ pigors on 6/25 - pulled from upda

	North Dakota Greater Sa

	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)	58,430	58,430	25,138	25,138
annual gas production (MCF)	8,933	8,933	3,843	3,843
cbng production (have # of wells)				

Note: production focused on new wells in priority, general and connectivity habitats

Revised numbers- per Ruth Miller, no changes to the production/well numbers--stays the sa

	Lewistown Sage-Grouse Amendment: email from Ad			
NOT APPLICABE-SEE NOTE	Alt A		Alt B	
BLM production	Draft	Revised	Draft	Revised
annual oil production (barrels)				
annual gas production (MCF)				
cbng production (have # of wells)				

Note: Email from Henry indicating that oil/gas production not included because production/

Hi Line RMP

Alt C		Alt D		Alt E	
Draft	Revised	Draft	Revised	Draft	Revised
137,044	137,044	140,264	140,264	138,891	138,891
18,278,203	18,278,203	21,639,476	21,639,476	20,097,721	20,141,212

ovided by Barney Whiteman

Balance Development (no GRSG) Preferred = proposed

Miles City RMP

Alt C		Alt D		Alt E	
Draft	Revised	Draft	Revised	Draft	Revised
426,000	5,962,895	434,000	5,968,421	307,000	5,924,211
709,000	7,972,632	722,000	7,975,789	512,000	7,928,421

xisting + avg annual new) from RFD * 15,000 bbls per well annually or 20,000 M

Balance Development Preferred

RMP

Alt C		Alt D	
Draft	Revised	Draft	Revised
~~429,628~~	~~429,628~~	~~427,882~~	~~427,882~~
~~221,418~~	~~221,418~~	~~220,518~~	~~220,518~~

GRGS will not affect O&G

ota RMP

Alt C		Alt D	
Draft	Revised	Draft	Revised
188,823	247,457	191,374	266,760
220,830	2,291,257	223,814	2,469,983
	-1,585,658		-1,406,933

ted SD RFD

ge-Grouse Amendment

Alt C		Alt D	
Draft	Revised	Draft	Revised
24,706	24,706	49,891	49,891
3,777	3,777	7,629	7,629

me

lam Carr June 4 stating that they are finalizing chpt 2 and will then send us the

Alt C		Alt D		~~Alt E~~	
Draft	Revised	Draft	Revised	~~Draft~~	~~Revised~~

development is not anticipated.

I

CF per well annually

	2012 Gas Marketed Production (MMCF)
California	246,822
Nevada	4
Oregon	
Idaho	
Montana	66,954
North Dakota	179,004
South Dakota	
Wyoming	2,022,275
Colorado	1,709,376
Utah	490,393
Total	4,714,828

http://www.eia.gov/dnav/ng/ng_prod_sum_a_epg0_vgm_mmcf_a.htm
http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm

Oil

Crude Oil Production (MBO)

Crude Oil Production (MBO)
197,211
368
26,495
243,831
1,754
57,837
49,310
30,268
607,074

Oil and Gas Supply, Reference case

Production and Supply	**2010**	**2011**	**2012**	**2013**
Crude Oil				Lower 48 Avg (Lower 48 Av
Lower 48 Average Wellhead Price 1/ (2011 dollars per barrel)	**76.781883**	**96.549911**	**95.302979**	**94.578941**
Production (million barrels per day) 2/				
United States Total	5.474001	5.666	6.335001	6.8267
Lower 48 Onshore	3.207	3.666	4.395	4.815
Tight Oil 3/	0.82	1.22	1.996511	2.297335
Carbon Dioxide Enhanced Oil Recovery	0.281452	0.244639	0.237233	0.231766
Other	2.105549	2.201361	2.161256	2.285899
Lower 48 Offshore	1.668	1.43	1.41	1.49
Alaska	0.599	0.57	0.53	0.5217
Lower 48 End of Year Reserves 2/ (billion barrels)	**21.459002**	**21.3647**	**22.179001**	**22.374485**
Natural Gas				Lower 48 Avg (Lower 48 Av
Prices (2011 dollars per million Btu)				
Henry Hub Spot Price	4.463206	3.98	2.618432	3.250835
Dry Production (trillion cubic feet) 4/				
United States Total	21.332418	23.000004	23.913954	24.001167
Lower 48 Onshore	18.540478	20.537783	21.40365	21.76738
Associated-Dissolved 5/	1.47101	1.54204	1.940662	2.079619
Non-Associated	17.069468	18.995743	19.462988	19.687761
Tight Gas	6.339177	5.856972	5.7648	5.88933
Shale Gas	4.86244	7.849509	8.134585	8.596787
Coalbed Methane	1.686133	1.70701	1.671253	1.691508
Other	4.181716	3.582252	3.892349	3.510134
Lower 48 Offshore	2.438551	2.110783	2.188928	1.924261
Associated-Dissolved 5/	0.59001	0.5355	0.5379	0.512664
Non-Associated	1.848541	1.575283	1.651029	1.411597
Alaska	0.353391	0.351437	0.321376	0.309526
Lower 48 End of Year Dry Reserves (tcf)	**295.788025**	**298.964294**	**303.049164**	**307.767487**
Supplemental Gas Supplies (tcf) 6/	**0.064573**	**0.061344**	**0.062003**	**0.065999**
Total Lower 48 Wells Drilled (thousands)	**43.268002**	**41.098003**	**43.577274**	**41.812431**

1/ Represents lower 48 onshore and offshore supplies.

2/ Includes lease condensate.

3/ Tight oil represents resources in low-permeability reservoirs, including shale and chalk formation included in the tight oil category are Bakken/Three Forks/Sanish, Eagle Ford, Woodford, Austin Chalk, Avalon/Bone Springs, and Monterey.

4/ Marketed production (wet) minus extraction losses.

5/ Gas which occurs in crude oil reserves either as free gas (associated) or as gas in solution with cru

6/ Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

Tcf = Trillion cubic feet.

Note: Totals may not equal sum of components due to independent rounding. Data for 2010 and 2 are model results and may differ slightly from official EIA data reports.

Sources: 2010 and 2011 crude oil lower 48 average wellhead price: U.S. Energy Information Administration (EIA), Petroleum Marketing Monthly, DOE/EIA-0380(2012/08) (Washington, DC, Augu 2010 and 2011 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: EIA, Petroleum Supply Annual 2011, DOE/EIA-0340(2011)/1 (Washington, DC, August 2012). 2010 U.S. crude oil and natural gas reserves: EIA, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, DOE/EIA-0216(2010) (Washington, DC, August 2012). 2010 Alaska and total natural gas production, and supplemental gas supplies: EIA, Natural Gas Annual 2010, DOE/EIA-0131(2010) (Washington, DC, December 2011). 2010 and 2011 Henry Hub natural ga 2011 Alaska and total natural gas production, and supplemental gas supplies: EIA, Natural Gas Monthly, DOE/EIA-0130(2012/07) (Washington, DC, July 2012). Other 2010 and 2011 values: EIA, Office of Energy Analysis. Projections: EIA, AEO2013 National Energy Modeling System.

http://www.eia.gov/forecasts/archive/aeo13/source_oil.cfm

http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2013&subject=0-AEO2013&table=14-AEO2

2014	2015	2016	2017	2018	2019	2020	2021
2015-2034		4.89633785					
2015-2034)/2012		1.11407005					
94.754753	**93.739525**	**94.926422**	**97.152016**	**99.209572**	**101.422142**	**103.490242**	**105.803345**
7.173943	7.286416	7.519074	7.499922	7.494084	7.535359	7.46745	7.375926
5.100279	5.199099	5.258268	5.273974	5.277542	5.302279	5.292743	5.269265
2.51381	2.634063	2.712253	2.748001	2.759783	2.780143	2.812524	2.800782
0.225435	0.224432	0.228947	0.237748	0.255003	0.273618	0.294217	0.317366
2.361034	2.340604	2.317069	2.288226	2.262756	2.248518	2.186002	2.151118
1.592061	1.628579	1.786638	1.722725	1.695291	1.729476	1.687685	1.636239
0.481603	0.458738	0.474167	0.503223	0.521251	0.503604	0.487022	0.470421
22.985886	**23.421427**	**24.140865**	**24.173378**	**24.296806**	**24.56946**	**24.627905**	**24.590326**
2015-2034		25.1207491					
2015-2034)/2012		1.1736666					
3.122056	3.118321	3.565787	3.697124	3.957792	4.046548	4.133872	4.258111
23.850746	24.03447	25.133928	25.40307	25.91855	26.307365	26.609287	26.943901
21.72085	21.844812	22.748993	23.087934	23.602161	23.973806	24.265926	24.554626
2.162209	2.205668	2.255706	2.192172	2.136925	2.124021	2.138406	2.137486
19.558641	19.639143	20.493288	20.895763	21.465235	21.849785	22.127522	22.417139
5.850707	5.853679	6.081648	6.205046	6.305055	6.373071	6.396613	6.441319
8.662588	8.854664	9.371642	9.788073	10.276134	10.697599	11.04945	11.376259
1.667106	1.641309	1.696505	1.710617	1.732226	1.728916	1.711591	1.698981
3.378241	3.289491	3.343491	3.192028	3.151818	3.050197	2.969866	2.900579
1.826172	1.891462	2.091764	2.026132	2.031086	2.051806	2.065477	2.115207
0.55214	0.574143	0.648229	0.641854	0.647115	0.671563	0.65919	0.652353
1.274032	1.31732	1.443535	1.384279	1.383971	1.380243	1.406286	1.462854
0.303723	0.298195	0.293172	0.289002	0.285303	0.281754	0.277883	0.274068
313.006134	**317.91394**	**321.123901**	**324.100769**	**327.077789**	**329.79483**	**332.509918**	**334.956635**
0.064152	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**
40.741428	**40.949291**	**44.793533**	**45.294056**	**47.411221**	**48.138767**	**48.838314**	**49.89735**

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2022	2023	2024	2025	2026	2027	2028	2029
108.169189	**110.626373**	**113.122673**	**115.609406**	**118.571426**	**121.314011**	**123.910553**	**126.480568**
7.219248	7.068348	6.904424	6.793805	6.608126	6.515001	6.422353	6.337394
5.188257	5.107995	5.038653	4.985122	4.869961	4.770901	4.702358	4.586041
2.742039	2.693296	2.666643	2.626653	2.524087	2.438361	2.386788	2.285328
0.343557	0.365769	0.397248	0.427322	0.456959	0.486586	0.50987	0.536254
2.102661	2.048929	1.974763	1.931147	1.888915	1.845955	1.805701	1.764458
1.595565	1.556123	1.489426	1.458619	1.413257	1.441878	1.438284	1.428976
0.435426	0.404231	0.376344	0.350064	0.324907	0.302222	0.281711	0.322377
24.524439	**24.495403**	**24.381409**	**24.368944**	**24.545185**	**24.691427**	**24.89562**	**24.846478**
4.476672	4.674166	4.786996	4.870593	5.020138	5.093993	5.219322	5.298791
27.392334	27.745607	28.159784	28.5884	28.946703	29.343349	29.468542	29.591518
24.923052	25.260969	25.475716	25.666124	25.787531	25.893456	26.01309	26.106758
2.123085	2.086374	2.045547	1.991706	1.862865	1.719167	1.608512	1.508287
22.799967	23.174597	23.430168	23.674419	23.924665	24.174288	24.404579	24.598473
6.485348	6.539511	6.557272	6.560491	6.589854	6.6056	6.610042	6.645211
11.769962	12.177048	12.515635	12.836027	13.099286	13.386937	13.657727	13.915623
1.696757	1.686559	1.67347	1.66493	1.665848	1.673105	1.681739	1.685948
2.847899	2.771478	2.683791	2.61297	2.569675	2.508644	2.455069	2.351689
2.199075	2.218451	2.184171	2.188842	2.191924	2.249595	2.259461	2.292238
0.658574	0.65796	0.642774	0.637447	0.628066	0.634832	0.619671	0.607042
1.540502	1.560492	1.541397	1.551396	1.563858	1.614763	1.639791	1.685196
0.270204	0.266185	0.499898	0.733432	0.967248	1.200297	1.19599	1.192524
336.99765	**338.599182**	**340.172607**	**342.083649**	**344.03479**	**345.894592**	**347.74176**	**349.109528**
0.064152	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**
51.140678	**52.445255**	**53.314049**	**54.263145**	**55.367867**	**56.002434**	**56.934444**	**57.218033**

2030	2031	2032	2033	2034	2035	2036	2037
129.261047	**131.611984**	**134.14978**	**137.052246**	**140.070755**	**143.312347**	**146.768219**	**150.156387**
6.302072	6.323145	6.317976	6.340319	6.317288	6.260004	6.108149	6.019697
4.476061	4.402694	4.358907	4.309985	4.256652	4.186677	4.125335	4.089824
2.194896	2.135726	2.102034	2.084679	2.071987	2.055218	2.045999	2.040363
0.557093	0.578546	0.600552	0.619236	0.635007	0.647925	0.644184	0.652929
1.724072	1.688422	1.656321	1.60607	1.549658	1.483534	1.435153	1.396532
1.441521	1.492104	1.544794	1.628948	1.671088	1.724301	1.639395	1.577648
0.38449	0.428348	0.414275	0.401385	0.389549	0.349025	0.343419	0.352225
24.921217	**25.169653**	**25.387117**	**25.792301**	**25.980074**	**26.186504**	**25.93379**	**25.771002**
5.39767	5.534947	5.63053	5.772282	6.036165	6.321915	6.694078	7.038929
29.789267	30.073664	30.398668	30.695408	30.992905	31.347679	31.670992	31.992294
26.262276	26.461605	26.639858	26.793877	27.052412	27.352213	27.785526	28.213837
1.428444	1.396099	1.376213	1.343363	1.300429	1.256111	1.206328	1.169476
24.833834	25.065506	25.263645	25.450514	25.751984	26.096102	26.579199	27.044361
6.668318	6.711075	6.750863	6.791497	6.870423	6.964009	7.073874	7.15672
14.170722	14.410891	14.622503	14.805022	15.045493	15.331297	15.680861	16.021158
1.687217	1.690113	1.696262	1.700789	1.711893	1.728649	1.783664	1.866949
2.307575	2.253425	2.194015	2.153202	2.124173	2.072146	2.040799	1.999532
2.33684	2.423505	2.571908	2.716244	2.756799	2.813811	2.705763	2.600381
0.604917	0.622842	0.653755	0.702256	0.722623	0.740172	0.698911	0.667677
1.731923	1.800663	1.918153	2.013987	2.034176	2.073638	2.006852	1.932705
1.19015	1.188554	1.186901	1.185288	1.183694	1.181657	1.179703	1.178073
350.650513	**351.995972**	**353.836731**	**354.884766**	**355.455627**	**356.257141**	**356.039398**	**356.322479**
0.064152	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**	**0.064152**
57.908295	**58.647892**	**59.761353**	**61.13501**	**62.466614**	**63.759655**	**67.659111**	**70.524353**

2038	2039	2040	Growth Rate (2011-2040)
153.183975	**156.814499**	**160.3806**	**1.80%**
6.045166	6.119087	6.126173	0.30%
4.053251	3.999123	3.968716	0.30%
2.028123	2.021516	2.015097	1.70%
0.660902	0.653219	0.658573	3.50%
1.364226	1.324389	1.295046	-1.80%
1.607237	1.719241	1.74769	0.70%
0.384678	0.400722	0.409767	-1.10%
25.951414	**26.534647**	**26.721083**	**0.80%**
7.420978	7.589039	7.828633	2.40%
32.391064	32.810646	33.141186	1.30%
28.621313	28.854677	29.117517	1.20%
1.13715	1.10811	1.08572	-1.20%
27.484163	27.746565	28.031796	1.40%
7.231437	7.276221	7.341923	0.80%
16.334793	16.524548	16.704332	2.60%
1.960441	2.041166	2.110712	0.70%
1.957491	1.904631	1.874827	-2.20%
2.592677	2.779536	2.847651	1.00%
0.678875	0.723926	0.735697	1.10%
1.913802	2.055609	2.111954	1.00%
1.177075	1.176435	1.176017	4.30%
356.735443	**359.181793**	**359.966309**	**0.60%**
0.064152	**0.064152**	**0.064152**	**0.20%**
73.105881	**74.502815**	**76.647949**	**2.20%**

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Saturday, April 4, 2015 8:03 PM
To: Uriarte, Alex
CC: Julie Suhr Pierce; Martin Hensley (mhensley@blm.gov)
Subject: Cumulative analysis

Thanks Alex. If that is current Washington Office direction, then please proceed as directed. I'm not sure but I think the comments on cumulative effects for Utah focused on phosphate. So it seems that is covered. Do you recall if we received cumulative impact comments in any of the subregions specific to O&G.

I'm sorry to see this analysis get removed given all the effort that was put in to make it happen. I suppose it uncovered some other issues that led to improved results. Thanks for you effort.

I wouldn't mind seeing the edits from Utah where "stated management was not consistent with what is in the Proposed Plan." I could see this helping us identify possible inconsistencies in other subregions too.

Hoping the finish line is close! Thanks again!

Josh

On Saturday, April 4, 2015, Uriarte, Alex <Alex.Uriarte@icfi.com> wrote:

> Thanks, Julie. I am copying Joh Sidon, because this is something we discussed quite a bit, I want to make sure he is aware and on board.
>
> Josh, please see below email from Quincy. My understanding per his email is that we should remove from the cumulative analysis the discussion of oil and gas cumulative estimates we were working on: only discussions of cumulative effects with neighboring areas should be included, not those across the GRSG range. Per his guidance, I will be removing. If this needs to be discussed, please let me know.
>
> Thanks,
>
> Alex
>
> **ALEX URIARTE** | Technical Specialist | 703.218.2587 | alex.uriarte@icfi.com | icfi.com
>
> **ICF INTERNATIONAL** | 9300 Lee Highway, Fairfax, VA 22031 | 703.934.3000

Connect with us on social media.

From: Julie Suhr Pierce [mailto:jsuhrpierce@blm.gov]
Sent: Friday, April 03, 2015 9:07 PM
To: Uriarte, Alex
Subject: FW: Clarification

Alex,

Please see the message below from Quincy and the attached edited Chapter 4 for Utah. This subject came up this morning and was discussed during an afternoon teleconference. I asked Quincy to clarify the instructions for me so that I could send to you something definitive regarding cumulative effects analysis.

Please let me know if you have any questions.

Best,

Julie

Julie A. Suhr Pierce, Ph.D.

Great Basin Socioeconomic Specialist

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801-597-2335 (cell)

From: Bahr, Quincy [mailto:qfbahr@blm.gov]
Sent: Friday, April 03, 2015 5:12 PM
To: Julie Suhr Pierce
Subject: Re: Clarification

We have been instructed that the Cumulative Effects Analysis Areas for all non-GRSG resources and uses, including minerals, should be the state or sub-region boundaries, or a specifically defined area taking into account nearby adjacent offices. However, other than GRSG, there was to be no range-wide analysis. For example, the added text to the cumulative impacts at the end of section 4.24.23 would have to be revised. Specifically, the text refers to two ways GRSG management could affect/be affected by other sub-regions of the GRSG range. The first way ("GRSG management in one sub-region may have effects that extend across sub-region borders and into counties also affected by GRSG management from other sub-regions") is encouraged. This would result in cumulative analysis that takes into account mineral developments from adjoining WY and CO counties. However, the second way ("when the GRSG range is analyzed as a whole") is what the WO direction dissuaded.

The paragraph that follows the one where the above quoted text was pulled (about phosphate) is an example of a cumulative analysis that, because it is not range-wide, is okay to retain.

Also, Skye went through the SE analysis looking for specific instances where the stated management was not consistent with what is in the Proposed Plan. Her edits are in the attached file.

Let me know if you have any questions.

Q

--

Quincy Bahr
Project Manager – Greater Sage-Grouse LUP Amendments, Utah Sub-Region
Planning and Environmental Coordinator – BLM, Utah State Office
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qfbahr@blm.gov

--
Josh Sidon
Branch Chief Planning and Assessment (Acting)
BLM Colorado State Office
303-239-3936

From: Miller, Chris J -FS [chrismiller@fs.fed.us]
Sent: Wednesday, March 25, 2015 2:55 PM
To: Uriarte, Alex; Johnson, Laura
CC: jsuhrpierce@blm.gov
Subject: FW: USFS Grazing Effects Analysis
Attachments: USFSGrazingEffectsAnalysisIDMT.docx; USFSGrazingEffectsAnalysisNevada.docx; USFSGrazingEffectsAnalysisNWCO.docx; USFSGrazingEffectsAnalysisUtah.docx; USFSGrazingEffectsAnalysisWyoming.docx

Hi Alex, Laura,

You have already received the FS grazing response to SE data request for FEIS. The attached files are the draft FEIS effects for grazing, coming from FS perspective – these docs include descriptions of AUMs potentially affected (ii.e., overlap habitat as per Dustin's explanation below). Its not completely clear if/how these AUM numbers needed to be included in chapter 3 or 4 for socio-economics – but there you have it.

Let me know if you have questions,
Chris

From: Bambrough, Dustin J -FS
Sent: Wednesday, March 25, 2015 10:56 AM
To: Quincy Bahr
Cc: sharphay@att.net; Mickelsen, Robert -FS; Rodriguez, Ron -FS; Zoe Ghali (zoe.ghali@empsi.com); Stein, Glen -FS; Dillon, Madelyn -FS; Miller, Chris J -FS; Julie Suhr Pierce
Subject: RE: USFS Grazing Effects Analysis

Yes. The AUMs that will be reported in the FS grazing effects analysis are the AUMs associated with allotments that intersect nesting and brood rearing/summer habitat, have permitted season of use during nesting and brood rearing seasons, and have more than 200 acres that intersect nesting and brood rearing habitat within occupied GRSG habitat. These variables will change the numbers of AUMs that were reported in the DEISs due to how we did the spatial analysis for the FEIS based on the language in the FS proposed plan. I don't have Utah numbers yet, but I made a comparison table for Idaho.

Forest	Allotments in DEIS	Allotments in FEIS	Active AUMs DEIS	Permitted (Active) AUMs FEIS	Acres PPH/PGH DEIS	Allotment Acres Nesting/Brood FEIS
Beaverhead-Deerlodge	83	70	207,600	94,730	326,200	284,617
Boise	16	12	48,300	9,604	76,100	67,879
Caribou-Targhee-Curlew	66	24	336,600	76,568	316,300	137,901
Salmon-Challis	82	49	142,200	109,844	544,700	351,218

Sawtooth	72	59	172,100	114,739	475,800	458,069
Total	319	214	906,800	405,485	1,739,100	1,299,684

That said, the FS grazing effects analysis does say that implementation of management direction under the proposed plan could result in a moderate reduction of AUMs over time, and could reduce AUMs on some allotments that could impact overall permittee operation viability. These impacts would not be known until proposed plan management is implemented at the allotment level in order to achieve desired conditions and annual grazing use guidelines. We discussed ways to determine a reduction in AUMs for the proposed plan at the planning level, but haven't been able to figure this out accurately at this broad of a scale. Hope that helps.

Dustin

From: Quincy Bahr [mailto:qfbahr@blm.gov]
Sent: Wednesday, March 25, 2015 9:31 AM
To: Bambrough, Dustin J -FS
Cc: sharphay@att.net; Mickelsen, Robert -FS; Rodriguez, Ron -FS; Zoe Ghali (zoe.ghali@empsi.com); Stein, Glen -FS; Dillon, Madelyn -FS; Miller, Chris J -FS; Julie Suhr Pierce
Subject: Re: USFS Grazing Effects Analysis

When you say "AUMs potentially impacted" do you mean AUMS associated with allotments that overlap PHMA/GHMA, where in places like ID or NV that may have changed from the DEIS? If that's what you mean, I understand. If you are referring to AUMs that may be affected based on applying the habitat objectives to a varied range condition and how that may affect operators, I have concerns. I had addressed the latter issue qualitatively in our SE submission to the SE contractor. They are almost done with the analysis. If those are the AUMs you're referencing, it may be too late to integrate them into the SE analysis, notwithstanding other concerns I have raised related to this issue on the weekly coordination calls.

Do the AUMs you're calculating tied just to allotments that overlap the redesigned PHMA/GHMA boundaries?

Quincy Bahr
BLM Utah State Office - Planning and Environmental Coordinator
801-539-4122 (office)
801-518-1479 (cell)

On Mar 25, 2015, at 12:10 AM, Bambrough, Dustin J -FS <dbambrough@fs.fed.us> wrote:

> Attached is the draft USFS Grazing Effects Analysis for Utah, Nevada, and ID/MT. I am still waiting on numbers to insert into table 4 that describes allotments, acres, and AUMs potentially impacted. We should have these numbers shortly. Let me know if you have any questions. Thanks
>
> <image001.png> **Dustin Bambrough**
> **Acting Deputy Director Natural Resources**

Forest Service
Intermountain Region

p: 801-625-5204
c: 435-790-5963
dbambrough@fs.fed.us

324 25th Street
Ogden, UT 84401
www.fs.fed.us
<image002.png><image003.png><image004.png>

Caring for the land and serving people

<USFSGrazingEffectsAnalysisUtah.docx>
<USFSGrazingEffectsAnalysisNevada.docx>
<USFSGrazingEffectsAnalysisIDMT.docx>

Idaho – Forest Service Proposed Plan Amendment Livestock Grazing Effects Analysis

Proposed Plan

Grazing management under the Proposed Plan on National Forest System (NFS) lands would be determined at the Forest unit level in order to achieve desired conditions and meet grazing use guidelines in GRSG seasonal habitats. Impacts to livestock grazing generally depend on current and site-specific biophysical conditions, livestock numbers, timing and duration of use, livestock management practices, range development and improvement levels, and permittee responsibilities, which are not easily addressed at the programmatic level. As a result, impacts on livestock grazing management would vary at a site-specific level and are described broadly for the Proposed Plan at the planning-unit scale.

Impacts from General GRSG Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would be managed to maintain residual herbaceous grass height for overhead and lateral concealment for GRSG nesting and early brood rearing life stages. Wet meadows and riparian areas would be managed to sustain a rich diversity of perennial forb species relative to site potential, and winter habitat would provide sufficient sagebrush height and density for food and cover for GRSG during this seasonal period.

Management to achieve these desired conditions would directly impact livestock grazing on NFS lands. These impacts could include modification of grazing strategies or rotation schedules, changes to duration and/or the season of use, changes to the kind and class of livestock, or reduction of livestock numbers. These modifications could result in the reduction of AUMs on some allotments. Management to achieve these desired conditions would also impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation.

Indirectly, implementation of management direction to achieve desired conditions in GRSG seasonal habitat as described in table 1 could be beneficial to livestock grazing in the long-term, particularly on allotments where rangeland conditions could be improved, by implementing management direction that improves rangeland conditions. Improved rangeland condition could also contribute to increased forage production.

Table 1. Seasonal Habitat Desired Conditions for GRSG.

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1-June 15) Apply 6.2 miles from active leks. [4]		
Lek Security	Proximity of trees [5]	Trees or other tall structures are none to uncommon within 1.86 miles of leks [6,7]

ATTRIBUTE	INDICATORS	DESIRED CONDTION
	Proximity of sagebrush to leks [6]	Adjacent protective sagebrush cover within 328 feet of lek [6]
Cover	Seasonal habitat extent [7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover[6,7,8]	15 to 25%
	Sagebrush height [7] Arid sites [6,7,9] Mesic sites [6,7,10]	 12 to 32 inches 16 to 32 inches
	Predominant sagebrush shape [6]	>50% in spreading [11]
	Perennial grass canopy cover [6,7] Arid sites [7,9] Mesic sites [7,10]	 ≥10% ≥15%
	Perennial grass height [6,7,8]	Provide overhead and lateral concealment from predators [7]
	Perennial forb canopy cover [6,7,8] Arid sites [9] Mesic sites [10]	 ≥5%[6,7] ≥10%[6,7]
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)		
Cover	Seasonal habitat extent [7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height [7,8]	16 to 32 inches
	Perennial grass canopy cover and forbs [7,8]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability [6,7]	Preferred forbs are common with several preferred species present [13]
WINTER[1] (Seasonal Use Period November 1-February 28)		
Cover and Food	Seasonal habitat extent [6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow [6,7,8]	>10%
	Sagebrush height above snow [6,7,8]	>10 inches [14]

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.

[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.

[4] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 6.2 miles is not appropriate.

[5] Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.

[6] Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl, eds. 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.

[7] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.

[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.

[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (HAF 2014).

[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (HAF 2014).

[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (HAF 2014).

[12] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.

[13] Preferred forbs are listed in HAF Table III-2 (HAF 2014). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

Impacts from Adaptive Management

Adaptive management measures under the Proposed Plan could have direct impacts on livestock grazing if it is determined that domestic livestock grazing is a causal factor in the deviation from GRSG conservation objectives. These impacts could include the cessation of livestock grazing or modification of numbers or season of use, which would reduce AUMs.

Impacts from Lands and Realty Management
Under the Proposed Plan, special use authorizations, land ownership adjustments, and land withdrawals would be restricted or mitigated to avoid or reduce adverse impacts to GRSG in priority and general habitat. This management direction would limit the direct and indirect impacts of development and surface disturbance on rangelands where livestock grazing is permitted. However, impacts could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Wind and Solar
Management direction prohibiting solar and wind development in priority habitat and imposing restrictions on development in general habitat would limit any impacts associated with ground disturbances from development of these resources. This management direction would limit the direct impacts of development and surface disturbances on existing rangelands, which would be beneficial to livestock grazing. However, this may shift impacts in areas outside of priority and general GRSG habitats, which could indirectly impact rangelands and grazing conditions through increased development.

Impacts from GRSG Habitat Management
Restoration activities under this alternative that reduce invasive annual grasses and other invasive plant species, conifers, and the spread and intensity of wildfire in GRSG seasonal habitats would be beneficial to livestock grazing because these activities will improve rangeland conditions and increase forage production in the long-term. Restrictions that temporarily close areas to grazing could impact permittees and operations in the short-term.

Impacts from Livestock Grazing Management
Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would also be managed in order to maintain residual perennial grass height to provide for adequate GRSG nesting cover according to the guidelines described in table 2.

Current direction for livestock grazing use in most Forest Plans in the planning areas is generally less restrictive than direction described under the Proposed Plan (Table 3). Therefore, grazing use guidelines under the Proposed Plan would directly impact livestock grazing management on NFS lands. Impacts could include modification of grazing strategies or rotation schedules, changes to the season of use, changes to kind and class of livestock, closure of a portion of an allotment, or reduction of livestock numbers. Implementation of this management direction could result in the reduction of AUMs on some allotments.

Table 2. Proposed Plan Grazing Guidelines for GRSG Seasonal Habitat.

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] within 6.2 miles of occupied leks	Perennial grass height: [2] When grazing occurs during breeding and nesting season (March 1 to July 15) manage

	for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (July 16 to October 31) manage for 4 inches [4,5,6] of perennial grass height.
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation [7,8]
Winter [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of GRSG see table 1.

[2] Grass heights only apply in breeding and nesting habitat with ≥10% sagebrush cover to support nesting.

[3] Holloran et al. 2005 *GRSG nesting habitat selection and success in Wyoming*.

[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).

[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of GRSG Centrocercus urophasianus nesting and brood-rearing habitats*. Wildlife Biology 13(1): 42-50.

[6] Stubble height to be measured at the end of the growing season.

[7] Crawford et al. 2004. Ecology and Management of GRSG and GRSG habitat. “In riparian brood-rearing habitat, GRSG prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth stimulated by moderate livestock grazing (Neel 1980, Evans 1986). “Moderate use equates to a 10-cm residual stubble height for most grasses and sedges.”

[8] Stubble height to be measured in the meadow areas used by GRSG for brood-rearing (not on the hydric greenline).

Table 3. Current Land and Resource Management Plan (Forest Plan) direction for livestock grazing use.

Forest/Grassland Plan	**Existing Upland Use Level[1]**	**Existing Riparian Use Level[1]**
Beaverhead-Deerlodge	40% - 65%	▪ 3”-6” SH[2]
Boise	40% - 50%	▪ 45% ▪ 4” SH
Caribou	35% - 55%	▪ 4”- 6” SH
Targhee	35% - 55%	▪ 4” SH ▪ 30% Browse[3]
Curlew	50% - 60%	▪ Use levels established at site specific level or in AMP
Salmon	▪ 25% - 65% ▪ 3” - 6” SH	▪ 25% - 65% ▪ 3”- 6” SH
Challis	None (Defers to AMP)	▪ Use levels established at site specific level or in AMP ▪ 50% Browse
Sawtooth	40% - 50%	▪ 45% or 4” SH

[1] As described in the current Land Resource Management Plan. Ranges vary according to grazing system (e.g., rest or deferred), season of use (e.g., early or late), range condition (e.g., satisfactory or unsatisfactory), vegetation type (e.g., alpine or non-native seeding), or other categories (e.g., greenline, key area, age class).

[2] SH – Stubble Height

[3] Annual utilization of current year’s growth of woody vegetation

Implementation of these guidelines could also directly impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation. Impacts would occur at the allotment scale as management direction is incorporated into permits, allotment management plans, and annual operating instructions. Management direction for livestock grazing under the Proposed Plan could decrease grazing in some allotments, and possibly overall operation viability. The level and intensity of impacts could vary on a site specific basis with permitted grazing likely decreasing moderately over time as permits are modified to achieve desired conditions and meet annual grazing use guidelines.

Grazing use guidelines under the Proposed Plan would impact about XXX allotments, XXX total acres, and XXX total AUMs in nesting and brood rearing habitats. Grazing use guidelines that limit forage use to 7 inches for perennial grasses during nesting season and 4 inches post nesting season would impact about XXX acres in nesting habitat within active grazing allotments (Table 4).

Table 4. Grazing Allotment Acres and AUMs intersecting GRSG Seasonal Habitat on National Forests and Grasslands within the EIS planning area.

Forest/Grassland	Allotment Acres in Nesting Habitat[1]	Allotment Acres In Brood Rearing/Summer Habitat[2]	Allotments in Nesting and Brood Rearing/Summer Habitat	Total AUMs for Allotments in Nesting and Brood Rearing/Summer Habitat[3]
Beaverhead-Deerlodge				
Boise				
Caribou-Targhee				
Curlew				
Salmon-Challis				
Sawtooth				

[1] Acres in active allotments with permitted dates during nesting season that intersect nesting habitat and have greater than 200 acres in occupied GRSG habitat.

[2] Acres in active allotments with permitted dates during brood rearing/summer season that intersect brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[3] Total AUMs for active allotments with permitted dates during nesting and brood rearing/summer season that intersect nesting and brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

Under the Proposed Plan sheep camps would not be located within 1.2 miles from the perimeter of a lek during lekking season and trailing of livestock during breeding and nesting seasons would be minimized during breeding and nesting seasons. This management direction would result in the need to modify grazing practices with increased costs for permittees in these areas.

Additional constraints under the Proposed Plan would also apply to structural range improvements in priority GRSG habitat compared to current plan direction. These include prohibiting fence construction or reconstruction within 1.2 miles from the perimeter of occupied leks unless the collision risk can be mitigated through design features or markings, not constructing new permanent livestock facilities (e.g., windmills, water tanks, corrals) within 1.2 miles from the perimeter of occupied leks, and not constructing water developments in priority habitat unless they are beneficial to GRSG.

Prohibitions on new structural improvements could limit the ability of permittees to effectively distribute livestock resulting in increases in time and costs to permittees and potentially the full use permitted AUMs. Although these constraints could increase the amount of time permittees spend to manage livestock on NFS lands, it should allow sufficient flexibility that permittees could continue to utilize structural range improvements to effectively distribute livestock.

Under the Proposed Plan, the Forest Service would consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities as opportunities arise where removal of livestock would enhance the ability to achieve desired habitat conditions as described in table 1. These actions would occur according to applicable regulations and, if implemented, would result in the reduction of overall available AUMs.

Managing livestock grazing to achieve the desired conditions in table 1 and livestock use guidelines in table 3 may indirectly benefit rangeland conditions by increasing vegetation productivity and increasing forage in the long term. This in turn would provide managers and permittees better management options, especially on those allotments where livestock numbers are approaching a sustainability threshold or during drought and other disturbances such as wildfire.

Impacts from Fire Management

Under the Proposed Plan, measures to protect GRSG habitat from fire and associated fire operations would be beneficial to livestock grazing, especially in the 12-inch or less precipitation zone, because it would help prevent expansion of non-native invasive species such as cheatgrass. Although management to suppress and control the spread of wildfire under the Proposed Plan would decrease the risk of disturbance from wildfire in GRSG habitat, fires outside of GRSG habitat would possibly be at risk of decreased suppression efforts. Management direction to protect GRSG habitat from fire in higher elevation sagebrush habitats (i.e., mountain big sagebrush) could indirectly negatively impact livestock grazing in the long-term as sagebrush potentially increases and forage production decreases.

Impacts from Wild Horse and Burro Management

Under Proposed Plan, wild horse and burro populations should be managed within appropriate management levels, or adjusted, to restore, enhance, or maintain GRSG desired habitat conditions as described in table 1. This management direction would be beneficial to livestock grazing in the long-term by increasing vegetation productivity and increasing forage production, particularly where rangeland conditions could be improved.

Impacts from Recreation Management

Under the Proposed Plan new recreation special use authorizations and expansion of special use authorizations would be restricted in priority habitat management areas. In addition, terms and conditions that that protect or restore GRSG habitat would be included in new special use authorizations and existing permits and operating plans would be modified to protect and/or restore GRSG habitat. Temporary recreation uses that result in the loss of GRSG habitat would not be authorized, and new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, campgrounds) would not be approved in priority habitat unless the development results in a net conservation gain to GRSG and/or their habitats.

This management direction would limit the direct and indirect impacts of recreation development on rangelands where livestock grazing is permitted. This management direction would have beneficial impacts to livestock grazing by reducing disturbances to rangelands from development and disturbances to livestock. However, impacts from recreation management could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Road/Transportation Management

Under the Proposed Plan new road or trail and construction would be prohibited in GRSG habitat, and road construction within riparian and mesic meadows would be restricted. This direction would be beneficial to livestock grazing by reducing impacts from roads rangeland and riparian areas. This could indirectly improve forage production and improve overall rangeland conditions. However, impacts from roads and transportation could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Minerals Management

Under the Proposed Plan, new fluid mineral leases would require a no surface occupancy stipulation in priority habitat and controlled surface use and timing restrictions in general habitat. New leases would be prioritized in non-habitat first and then in the least suitable habitat for GRSG.

For existing leases under the Proposed Plan, leaseholders would be required to avoid and minimize surface disturbing and disruptive activities in priority habitat for leases that are not yet developed. In addition, reclamation plans would be designed to restore habitat to desired conditions described in table 1. Fluid mineral operations would be mitigated in priority habitat to reduce soil compaction to improve vegetation reestablishment and keep GRSG habitat disturbance to a minimum.

Surface disturbances would also be prohibited for unleased coal mines in priority habitat as well as other mitigation measures to reduce disturbances for leased coal mines and associated facilities. Locatable mineral, non-energy leasable, and mineral material operations in priority habitat would be mitigated to protect GRSG habitat.

Minerals management direction under the Proposed Plan would have positive impacts for livestock grazing in priority and general GRSG habitats because development and surface disturbance would be limited, and the potential from development related disturbance of rangeland and forage resources would be reduced. However, impacts from new and existing mineral leases could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

03/24/2015

Nevada – Forest Service Proposed Plan Amendment Livestock Grazing Effects Analysis

Proposed Plan
Grazing management under the Proposed Plan on National Forest System (NFS) lands would be determined at the Forest unit level in order to achieve desired conditions and meet grazing use guidelines in GRSG seasonal habitats. Impacts to livestock grazing generally depend on current and site-specific biophysical conditions, livestock numbers, timing and duration of use, livestock management practices, range development and improvement levels, and permittee responsibilities, which are not easily addressed at the programmatic level. As a result, impacts on livestock grazing management would vary at a site-specific level and are described broadly for the Proposed Plan at the planning-unit scale.

Impacts from General GRSG Management
Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in tables 1a and 1b. Livestock grazing would be managed to maintain residual herbaceous grass height for overhead and lateral concealment for GRSG nesting and early brood rearing life stages. Wet meadows and riparian areas would be managed to sustain a rich diversity of perennial forb species relative to site potential, and winter habitat would provide sufficient sagebrush height and density for food and cover for GRSG during this seasonal period.

Management to achieve these desired conditions would directly impact livestock grazing on NFS lands. These impacts could include modification of grazing strategies or rotation schedules, changes to duration and/or the season of use, changes to the kind and class of livestock, or reduction of livestock numbers. These modifications could result in the reduction of AUMs on some allotments. Management to achieve these desired conditions would also impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation.

Indirectly, implementation of management direction to achieve desired conditions in GRSG seasonal habitat as described in tables 1a and 1b could be beneficial to livestock grazing in the long-term, particularly on allotments where rangeland conditions could be improved, by implementing management direction that improves rangeland conditions. Improved rangeland condition could also contribute to increased forage production.

Table 1a. Seasonal Habitat Desired Conditions for Greater Sage-grouse (Ecoregion 342).

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1-June 30) Apply 4.0 miles from active leks. [15]		
Lek Security	Proximity of Pinyon-and/or Juniper [4]	Pinyon and/or Juniper none to uncommon within 1.86 miles (3 km) of leks [5,6]
	Proximity of sagebrush to leks [5]	Adjacent protective sagebrush cover within 328 feet of lek [5]
Cover	Seasonal habitat extent [6]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [5,6,7]	> 20%
	Sagebrush height [6] Arid sites [5,6,9] Mesic sites [5,6,10]	> 12>16
	Predominant sagebrush shape [5]	>50% in spreading [11]
	Perennial grass cover [5,6] Arid sites [6,9] Mesic sites [6,10]	≥10% ≥15%
	Perennial grass height [5,6,7]	Provide overhead and lateral concealment from predators [6]
	Perennial forb canopy cover [5,6,7] Arid sites [9] Mesic sites [10]	≥5%[5,6] ≥10%[5,6]
BROOD-REARING/SUMMER[1] (Seasonal Use Period May 15 to September 15)		
Cover	Seasonal habitat extent [6]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [5, 6,7]	10 to 25%
	Sagebrush height [6,7]	> 16
	Perennial grass canopy cover and forbs [6,7]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [13]
	Upland and riparian perennial forb availability [5,6]	Preferred forbs are common with several preferred species present [12]
WINTER/FALL[1] (Seasonal Use Period September 1 to February 28)		
Cover and Food	Seasonal habitat extent [5,6,7]	>80% of the winter habitat
	Sagebrush canopy cover above snow [5,6,7]	>10%
	Sagebrush height above snow [5,6,7]	>10 inches [14]

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.

[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.

[4] Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.

[5] Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. *Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies,* Technical Reference XXXX -X. U.S. Bureau of Land Management, Denver, Colorado. Submitted for publication.

[6] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.

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[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (HAF 2014).

[12] Preferred forbs are listed in HAF Table III-2 (HAF 2014). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

[13] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.

ATTRIBUTE	INDICATORS	DESIRED CONDTION
[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands. [15] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.		

Table 1b. Seasonal Habitat Desired Conditions for Greater Sage-grouse (Ecoregion 341).

ATTRIBUTE	INDICATOR	DESIRED CONDITION
GENERAL/LANDSCAPE-LEVEL		
Cover (Nesting)	Seasonal Habitat Needed	>65% of the landscape in sagebrush cover[1]
	Annual Grasses	< %5[3]
Security (Nesting)	Conifer encroachment	<3% phase I (>0% to <25% cover) No phase II (25 – 50% cover) No phase III (>50% cover)
Cover and Food (Winter)	Conifer encroachment	<5% phase I (>0% to <25% cover) No phase II (25 – 50% cover) No phase III (>50% cover)
	Sagebrush extent	>85% sagebrush land cover
LEK		
Cover	Availability of sagebrush cover	Has adjacent sagebrush cover[7,15]
Security [4]	Pinyon and/or Juniper cover	<3% landscape canopy cover within 1 km of leks[2]
	Proximity of tall structures (1 meter above shrub canopy)	None within 3 miles (5 kilometers)[6,6]
NESTING		
Cover	Sagebrush canopy cover	≥20%[11,12]
	Residual and live perennial grass cover	≥10% if shrub cover <25%[2,6,5]
	Annual grass cover [5]	<5%[13]
	Perennial grass height	Provide overhead and lateral concealment from predators[7]
	Total shrub cover	≥30%[5,11]
Security	Proximity of tall structure (1 meter above shrub canopy)	None within 3 miles[16]
BROOD-REARING/SUMMER		
Cover	Sagebrush canopy cover	10%-25%[7]
	Perennial grass canopy cover and forbs	>15% combined perennial grass and forb canopy cover[7]
Cover and Food	Perennial forb canopy cover	≥5% arid (<10 inches precipitation) ≥15% mesic (> 10 inches or meadow system)
Food	Riparian Areas/Meadows	Proper Functioning Condition[1,15]
	Understory species richness (in the vicinity of riparian areas/meadows)	≥ 5 preferred forb species present[3,4]
Security	Riparian Area/Meadow Interspersion with adjacent sagebrush	Has adjacent sagebrush cover[7,15]
WINTER		
Cover and Food	Sagebrush canopy cover	≥10% above snow depth[7]
	Sagebrush height	>9.8 inches (25 centimeters) above snow depth[7]

[1] Upland standards are based on indicators for canopy and ground cover, including litter, live vegetation, and rock, appropriate to the ecological potential of the site.

[2] In addition, if upland rangeland health standards are being met.

[3] Standard considered in addition to Proper Functioning Condition (PFC). Includes all mesic plant species.

[4] Applicable to Phase I and Phase II pinyon and/or juniper.

ATTRIBUTE	INDICATOR	DESIRED CONDITION
[6]Does not include fences.		

Impacts from Adaptive Management

Adaptive management measures under the Proposed Plan could have direct impacts on livestock grazing if it is determined that domestic livestock grazing is a causal factor in the deviation from GRSG conservation objectives. These impacts could include the cessation of livestock grazing or modification of numbers or season of use, which would reduce AUMs.

Impacts from Lands and Realty Management

Under the Proposed Plan, special use authorizations, land ownership adjustments, and land withdrawals would be restricted or mitigated to avoid or reduce adverse impacts to GRSG in priority and general habitat. This management direction would limit the direct and indirect impacts of development and surface disturbance on rangelands where livestock grazing is permitted. However, impacts could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Wind and Solar

Management direction prohibiting solar and wind development in priority habitat and imposing restrictions on development in general habitat would limit any impacts associated with ground disturbances from development of these resources. This management direction would limit the direct impacts of development and surface disturbances on existing rangelands, which would be beneficial to livestock grazing. However, this may shift impacts in areas outside of priority and general GRSG habitats, which could indirectly impact rangelands and grazing conditions through increased development.

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Restoration activities under this alternative that reduce invasive annual grasses and other invasive plant species, conifers, and the spread and intensity of wildfire in GRSG seasonal habitats would be beneficial to livestock grazing because these activities will improve rangeland conditions and increase forage production in the long-term. Restrictions that temporarily close areas to grazing could impact permittees and operations in the short-term.

Impacts from Livestock Grazing Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in tables 1a and 1b. Livestock grazing would also be managed in order to maintain residual perennial grass height to provide for adequate GRSG nesting cover according to the guidelines described in table 2.

Current direction for livestock grazing use in most Forest Plans in the planning areas is generally less restrictive than direction described under the Proposed Plan (Table 3). Therefore, grazing use guidelines under the Proposed Plan would directly impact livestock grazing management on NFS lands. Impacts could include modification of grazing strategies or rotation schedules, changes to the season of use, changes to kind and class of livestock, closure of a portion of an allotment, or reduction of livestock numbers. Implementation of this management direction could result in the reduction of AUMs on some allotments.

Table 2. Proposed Plan Grazing Guidelines for GRSG Seasonal Habitat.

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] within 4 miles of occupied leks	Perennial grass height: [2] When grazing occurs during breeding and nesting season (March 1 to June 30) manage for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (May 15 to September 15) manage for 4 inches [4,5,6] of perennial grass height.
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation [7,8]
Winter [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of GRSG see tables 1a and 1b.

[2] Grass heights only apply in breeding and nesting habitat with ≥10% sagebrush cover to support nesting.

[3] Holloran et al. 2005 *GRSG nesting habitat selection and success in Wyoming*.

[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).

[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of GRSG Centrocercus urophasianus nesting and brood-rearing habitats*. Wildlife Biology 13(1): 42-50.

[6] Stubble height to be measured at the end of the growing season.

[7] Crawford et al. 2004. Ecology and Management of GRSG and GRSG habitat. “In riparian brood-rearing habitat, GRSG prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth stimulated by moderate livestock grazing (Neel 1980, Evans 1986). “Moderate use equates to a 10-cm residual stubble height for most grasses and sedges.”

[8] Stubble height to be measured in the meadow areas used by GRSG for brood-rearing (not on the hydric greenline).

Table 3. Current Land and Resource Management Plan (Forest Plan) direction for livestock grazing use.

Forest Plan	Existing Upland Use Level[1]	Existing Riparian Use Level[1]
Humboldt	55% - 65%	▪ 35% - 70% ▪ 35% Browse[2]
Toiyabe	30% - 55%	▪ 45% - 65%

[1] As described in the current Land Resource Management Plan. Ranges vary according to grazing system (e.g., rest or deferred), season of use (e.g., early or late), range condition (e.g., satisfactory or unsatisfactory), vegetation type (e.g., alpine or non-native seeding), or other categories (e.g., greenline, key area, age class).

[2] Annual utilization of current year’s growth of woody vegetation

Implementation of these guidelines could also directly impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation. Impacts would occur at the allotment scale as management direction is incorporated into permits, allotment management plans, and annual operating instructions. Management direction for livestock grazing under the Proposed Plan could decrease grazing in some allotments, and possibly overall operation viability. The level and intensity of impacts could vary on a site specific basis with permitted grazing likely decreasing moderately over time as permits are modified to achieve desired conditions and meet annual grazing use guidelines.

Grazing use guidelines under the Proposed Plan would impact about XXX allotments, XXX total acres, and XXX total AUMs in nesting and brood rearing habitats. Grazing use guidelines that limit forage use to 7 inches for perennial grasses during nesting season and 4 inches post nesting season would impact about XXX acres in nesting habitat within active grazing allotments (Table 4).

Table 4. Grazing Allotment Acres and AUMs intersecting GRSG Seasonal Habitat on the Humboldt-Toiyabe National Forest within the EIS planning area.

Allotment Acres in Nesting Habitat[1]	Allotment Acres In Brood Rearing/ Summer Habitat[2]	Allotments in Nesting and Brood Rearing/ Summer Habitat	Total AUMs for Allotments in Nesting and Brood Rearing/ Summer Habitat[3]

[1] Acres in active allotments with permitted dates during nesting season that intersect nesting habitat and have greater than 200 acres in occupied GRSG habitat.

[2] Acres in active allotments with permitted dates during brood rearing/summer season that intersect brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[3] Total AUMs for active allotments with permitted dates during nesting and brood rearing/summer season that intersect nesting and brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

Under the Proposed Plan sheep camps would not be located within 1.2 miles from the perimeter of a lek during lekking season and trailing of livestock during breeding and nesting seasons would be minimized during breeding and nesting seasons. This management direction would result in the need to modify grazing practices with increased costs for permittees in these areas.

Additional constraints under the Proposed Plan would also apply to structural range improvements in priority GRSG habitat compared to current plan direction. These include prohibiting fence construction or reconstruction within 1.2 miles from the perimeter of occupied leks unless the collision risk can be mitigated through design features or markings, not constructing new permanent livestock facilities (e.g., windmills, water tanks, corrals) within 1.2 miles from the perimeter of occupied leks, not constructing water developments in priority habitat unless they are beneficial to GRSG, and installing and maintaining wildlife escape ramps when vertical embankments in water troughs or open water facilities pose a drowning risk to birds.

Prohibitions on new structural improvements could limit the ability of permittees to effectively distribute livestock resulting in increases in time and costs to permittees and potentially the full use permitted AUMs. Additional maintenance requirements for existing structural improvements could increase the amount of time permittees spend to on maintenance as well as additional material and labor costs. Although these constraints could increase the amount of time permittees spend to manage livestock on NFS lands, it should allow sufficient flexibility that permittees could continue to utilize structural range improvements to effectively distribute livestock.

Under the Proposed Plan, the Forest Service would consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities as opportunities arise where removal of livestock would enhance the ability to achieve desired habitat conditions as described in tables 1a and 1b. These actions would occur according to applicable regulations and, if implemented, would result in the reduction of overall available AUMs.

Managing livestock grazing to achieve the desired conditions in tables 1a and 1b and livestock use guidelines in table 3 may indirectly benefit rangeland conditions by increasing vegetation productivity and increasing forage in the long term. This in turn would provide managers and permittees better management options, especially on those allotments where livestock numbers are approaching a sustainability threshold or during drought and other disturbances such as wildfire.

Impacts from Fire Management

Under the Proposed Plan, measures to protect GRSG habitat from fire and associated fire operations would be beneficial to livestock grazing, especially in the 12-inch or less precipitation zone, because it would help prevent expansion of non-native invasive species such as cheatgrass. Although management to suppress and control the spread of wildfire under the Proposed Plan would decrease the risk of disturbance from wildfire in GRSG habitat, fires outside of GRSG habitat would possibly be at risk of decreased suppression efforts. Management direction to protect GRSG habitat from fire in higher elevation sagebrush habitats (i.e., mountain big sagebrush) could indirectly negatively impact livestock grazing in the long-term as sagebrush potentially increases and forage production decreases.

Impacts from Wild Horse and Burro Management

Under Proposed Plan, wild horse and burro populations should be managed within appropriate management levels, or adjusted, to restore, enhance, or maintain GRSG desired habitat conditions as described in tables 1a and 1b. This management direction would be beneficial to livestock grazing in the long-term by increasing vegetation productivity and increasing forage production, particularly where rangeland conditions could be improved.

Impacts from Recreation Management

Under the Proposed Plan new recreation special use authorizations and expansion of special use authorizations would be restricted in priority habitat management areas. In addition, terms and conditions that that protect or restore GRSG habitat would be included in new special use authorizations and existing permits and operating plans would be modified to protect and/or restore GRSG habitat. Temporary recreation uses that result in the loss of GRSG habitat would not be authorized, and new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, campgrounds) would not be approved in priority habitat unless the development results in a net conservation gain to GRSG and/or their habitats.

This management direction would limit the direct and indirect impacts of recreation development on rangelands where livestock grazing is permitted. This management direction would have beneficial impacts to livestock grazing by reducing disturbances to rangelands from development and disturbances to livestock. However, impacts from recreation management could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Road/Transportation Management

Under the Proposed Plan new road or trail and construction would be prohibited in GRSG habitat, and road construction within riparian and mesic meadows would be restricted. This direction would be beneficial to livestock grazing by reducing impacts from roads rangeland and riparian areas. This could indirectly improve forage production and improve overall rangeland conditions. However, impacts from roads and transportation could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Minerals Management

Under the Proposed Plan, new fluid mineral leases would require a no surface occupancy stipulation in priority habitat and controlled surface use and timing restrictions in general habitat. New leases would be prioritized in non-habitat first and then in the least suitable habitat for GRSG.

For existing leases under the Proposed Plan, leaseholders would be required to avoid and minimize surface disturbing and disruptive activities in priority habitat for leases that are not yet developed. In addition, reclamation plans would be designed to restore habitat to desired conditions described in tables 1a and 1b. Fluid mineral operations would be mitigated in priority habitat to reduce soil compaction to improve vegetation reestablishment and keep GRSG habitat disturbance to a minimum.

Surface disturbances would also be prohibited for unleased coal mines in priority habitat as well as other mitigation measures to reduce disturbances for leased coal mines and associated facilities. Locatable mineral, non-energy leasable, and mineral material operations in priority habitat would be mitigated to protect GRSG habitat.

Minerals management direction under the Proposed Plan would have positive impacts for livestock grazing in priority and general GRSG habitats because development and surface disturbance would be limited, and the potential from development related disturbance of rangeland and forage resources would be reduced. However, impacts from new and existing mineral leases could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Northwest Colorado – Forest Service Proposed Plan Amendment Livestock Grazing Effects Analysis

Proposed Plan

Grazing management under the Proposed Plan on National Forest System (NFS) lands would be determined at the Forest unit level in order to achieve desired conditions and meet grazing use guidelines in GRSG seasonal habitats. Impacts to livestock grazing generally depend on current and site-specific biophysical conditions, livestock numbers, timing and duration of use, livestock management practices, range development and improvement levels, and permittee responsibilities, which are not easily addressed at the programmatic level. As a result, impacts on livestock grazing management would vary at a site-specific level and are described broadly for the Proposed Plan at the planning-unit scale.

Impacts from General GRSG Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would be managed to maintain residual herbaceous grass height for overhead and lateral concealment for GRSG nesting and early brood rearing life stages. Wet meadows and riparian areas would be managed to sustain a rich diversity of perennial forb species relative to site potential, and winter habitat would provide sufficient sagebrush height and density for food and cover for GRSG during this seasonal period.

Management to achieve these desired conditions would directly impact livestock grazing on NFS lands. These impacts could include modification of grazing strategies or rotation schedules, changes to duration and/or the season of use, changes to the kind and class of livestock, or reduction of livestock numbers. These modifications could result in the reduction of AUMs on some allotments. Management to achieve these desired conditions would also impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation.

Indirectly, implementation of management direction to achieve desired conditions in GRSG seasonal habitat as described in table 1 could be beneficial to livestock grazing in the long-term, particularly on allotments where rangeland conditions could be improved, by implementing management direction that improves rangeland conditions. Improved rangeland condition could also contribute to increased forage production.

Table 1. Seasonal Habitat Desired Conditions for GRSG.

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks. [4]		
Lek Security	Proximity of trees [5]	Trees or other tall structures are none to uncommon within 1.86 miles of leks [6,7]

ATTRIBUTE	INDICATORS	DESIRED CONDTION
	Proximity of sagebrush to leks [6]	Adjacent protective sagebrush cover within 328 feet of lek [6]
Cover	Seasonal habitat extent [7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [6,7,8]	15 to 25%
	Sagebrush height [7] Arid sites [6,7,9] Mesic sites [6,7,10]	 12 to 32 inches 16 to 32 inches
	Predominant sagebrush shape [6]	>50% in spreading [11]
	Perennial grass canopy cover [6,7] Arid sites[7,9] Mesic sites [710]	 ≥10% ≥15%
	Perennial grass height [6,7,8]	Provide overhead and lateral concealment from predators [7]
	Perennial forb canopy cover [6,7,8] Arid sites [9] Mesic sites [10]	 ≥5%[6,7] ≥10%[6,7]
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)		
Cover	Seasonal habitat extent [7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height [7,8]	16 to 32 inches
	Perennial grass canopy cover and forbs [7,8]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability [6,7]	Preferred forbs are common with several preferred species present [13]
WINTER[1] (Seasonal Use Period November 1-February 28)		
Cover and Food	Seasonal habitat extent [6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow [6,7,8]	>10%
	Sagebrush height above snow [6,7,8]	>10 inches [14]

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.

[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.

[4] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.

[5] Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.

[6] Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl, eds. 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.

[7] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.

[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.

[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (HAF 2014).

[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (HAF 2014).

[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (HAF 2014).

[12] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.

[13] Preferred forbs are listed in HAF Table III-2 (HAF 2014). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

Impacts from Adaptive Management

Adaptive management measures under the Proposed Plan could have direct impacts on livestock grazing if it is determined that domestic livestock grazing is a causal factor in the deviation from GRSG conservation objectives. These impacts could include the cessation of livestock grazing or modification of numbers or season of use, which would reduce AUMs.

Impacts from Lands and Realty Management

Under the Proposed Plan, special use authorizations, land ownership adjustments, and land withdrawals would be restricted or mitigated to avoid or reduce adverse impacts to GRSG in priority and general habitat. This management direction would limit the direct and indirect impacts of development and surface disturbance on rangelands where livestock grazing is permitted. However, impacts could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Wind and Solar

Management direction prohibiting solar and wind development in priority habitat and imposing restrictions on development in general habitat would limit any impacts associated with ground disturbances from development of these resources. This management direction would limit the direct impacts of development and surface disturbances on existing rangelands, which would be beneficial to livestock grazing. However, this may shift impacts in areas outside of priority and general GRSG habitats, which could indirectly impact rangelands and grazing conditions through increased development.

Impacts from GRSG Habitat Management

Restoration activities under this alternative that reduce invasive annual grasses and other invasive plant species, conifers, and the spread and intensity of wildfire in GRSG seasonal habitats would be beneficial to livestock grazing because these activities will improve rangeland conditions and increase forage production in the long-term. Restrictions that temporarily close areas to grazing could impact permittees and operations in the short-term.

Impacts from Livestock Grazing Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would also be managed in order to maintain residual perennial grass height to provide for adequate GRSG nesting cover according to the guidelines described in table 2.

Current direction for livestock grazing use in most Forest Plans in the planning areas is generally less restrictive than direction described under the Proposed Plan (Table 3). Therefore, grazing use guidelines under the Proposed Plan would directly impact livestock grazing management on NFS lands. Impacts could include modification of grazing strategies or rotation schedules, changes to the season of use, changes to kind and class of livestock, closure of a portion of an allotment, or reduction of livestock numbers. Implementation of this management direction could result in the reduction of AUMs on some allotments.

Table 2. Proposed Plan Grazing Guidelines for GRSG Seasonal Habitat.

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] within 4 miles of occupied leks	Perennial grass height: [2] When grazing occurs during breeding and nesting season (March 1 to June 15) manage

	for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (June 16 to October 31) manage for 4 inches [4,5,6] of perennial grass height.
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation [7,8]
Winter [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of GRSG see table 1.

[2] Grass heights only apply in breeding and nesting habitat with ≥10% sagebrush cover to support nesting.

[3] Holloran et al. 2005 *GRSG nesting habitat selection and success in Wyoming*.

[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).

[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of GRSG Centrocercus urophasianus nesting and brood-rearing habitats*. Wildlife Biology 13(1): 42-50.

[6] Stubble height to be measured at the end of the growing season.

[7] Crawford et al. 2004. Ecology and Management of GRSG and GRSG habitat. "In riparian brood-rearing habitat, GRSG prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth
stimulated by moderate livestock grazing (Neel 1980, Evans 1986). "Moderate use equates to a 10-cm residual stubble height for most grasses and sedges."

[8] Stubble height to be measured in the meadow areas used by GRSG for brood-rearing (not on the hydric greenline).

Table 3. Current Land and Resource Management Plan (Forest Plan) direction for livestock grazing use.

Forest Plan	Existing Upland Use Level[1]	Existing Riparian Use Level[1]
Routt	0% - 55%	4"- 6" SH[2]

[1] As described in the current Land Resource Management Plan. Ranges vary according to grazing system (e.g., rest or deferred), season of use (e.g., early or late), range condition (e.g., satisfactory or unsatisfactory), vegetation type (e.g., alpine or non-native seeding), or other categories (e.g., greenline, key area, age class).

[3] SH – Stubble Height[2]

Implementation of these guidelines could also directly impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation. Impacts would occur at the allotment scale as management direction is incorporated into permits, allotment management plans, and annual operating instructions. Management direction for livestock grazing under the Proposed Plan could decrease grazing in some allotments, and possibly overall operation viability. The level and intensity of impacts could vary on a site specific basis with permitted grazing likely decreasing moderately over time as permits are modified to achieve desired conditions and meet annual grazing use guidelines.

Grazing use guidelines under the Proposed Plan would impact about XXX allotments, XXX total acres, and XXX total AUMs in nesting and brood rearing habitats. Grazing use guidelines that limit forage use to 7 inches for perennial grasses during nesting season and 4 inches post nesting season would impact about XXX acres in nesting habitat within active grazing allotments (Table 4).

Table 4. Grazing Allotment Acres and AUMs intersecting GRSG Seasonal Habitat in Northwest Colorado on the Routt portion of the Medicine Bow-Routt National Forest within the EIS planning area

Allotment Acres in Nesting Habitat[1]	Allotment Acres In Brood Rearing/Summer	Allotments in Nesting and Brood Rearing/Summer	Total AUMs for Allotments in Nesting and Brood Rearing/Summer Habitat[3]

	Habitat[2]	**Habitat**	

[1] Acres in active allotments with permitted dates during nesting season that intersect nesting habitat and have greater than 200 acres in occupied GRSG habitat.

[2] Acres in active allotments with permitted dates during brood rearing/summer season that intersect brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[3] Total AUMs for active allotments with permitted dates during nesting and brood rearing/summer season that intersect nesting and brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

Under the Proposed Plan sheep camps would not be located within 1.2 miles from the perimeter of a lek during lekking season and trailing of livestock during breeding and nesting seasons would be minimized during breeding and nesting seasons. This management direction would result in the need to modify grazing practices with increased costs for permittees in these areas.

Additional constraints under the Proposed Plan would also apply to structural range improvements in priority GRSG habitat compared to current plan direction. These include prohibiting fence construction or reconstruction within 1.2 miles from the perimeter of occupied leks unless the collision risk can be mitigated through design features or markings, not constructing new permanent livestock facilities (e.g., windmills, water tanks, corrals) within 1.2 miles from the perimeter of occupied leks, and not constructing water developments in priority habitat unless they are beneficial to GRSG.

Prohibitions on new structural improvements could limit the ability of permittees to effectively distribute livestock resulting in increases in time and costs to permittees and potentially the full use permitted AUMs. Although these constraints could increase the amount of time permittees spend to manage livestock on NFS lands, it should allow sufficient flexibility that permittees could continue to utilize structural range improvements to effectively distribute livestock.

Under the Proposed Plan, the Forest Service would consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities as opportunities arise where removal of livestock would enhance the ability to achieve desired habitat conditions as described in table 1. These actions would occur according to applicable regulations and, if implemented, would result in the reduction of overall available AUMs.

Managing livestock grazing to achieve the desired conditions in table 1 and livestock use guidelines in table 3 may indirectly benefit rangeland conditions by increasing vegetation productivity and increasing forage in the long term. This in turn would provide managers and permittees better management options, especially on those allotments where livestock numbers are approaching a sustainability threshold or during drought and other disturbances such as wildfire.

Impacts from Fire Management

Under the Proposed Plan, measures to protect GRSG habitat from fire and associated fire operations would be beneficial to livestock grazing, especially in the 12-inch or less precipitation zone, because it would help prevent expansion of non-native invasive species such as cheatgrass. Although management to suppress and control the spread of wildfire under the Proposed Plan would decrease the risk of disturbance from wildfire in GRSG habitat, fires outside of GRSG habitat would possibly be at risk of decreased suppression efforts. Management direction to protect GRSG habitat from fire in higher elevation sagebrush habitats (i.e., mountain big sagebrush) could indirectly negatively impact livestock grazing in the long-term as sagebrush potentially increases and forage production decreases.

Impacts from Wild Horse and Burro Management

Under Proposed Plan, wild horse and burro populations should be managed within appropriate management levels, or adjusted, to restore, enhance, or maintain GRSG desired habitat conditions as described in table 1. This management direction would be beneficial to livestock grazing in the long-term by increasing vegetation productivity and increasing forage production, particularly where rangeland conditions could be improved.

Impacts from Recreation Management

Under the Proposed Plan new recreation special use authorizations and expansion of special use authorizations would be restricted in priority habitat management areas. In addition, terms and conditions that that protect or restore GRSG habitat would be included in new special use authorizations and existing permits and operating plans would be modified to protect and/or restore GRSG habitat. Temporary recreation uses that result in the loss of GRSG habitat would not be authorized, and new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, campgrounds) would not be approved in priority habitat unless the development results in a net conservation gain to GRSG and/or their habitats.

This management direction would limit the direct and indirect impacts of recreation development on rangelands where livestock grazing is permitted. This management direction would have beneficial impacts to livestock grazing by reducing disturbances to rangelands from development and disturbances to livestock. However, impacts from recreation management could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Road/Transportation Management

Under the Proposed Plan new road or trail and construction would be prohibited in GRSG habitat, and road construction within riparian and mesic meadows would be restricted. This direction would be beneficial to livestock grazing by reducing impacts from roads rangeland and riparian areas. This could indirectly improve forage production and improve overall rangeland conditions. However, impacts from roads and transportation could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Minerals Management

Under the Proposed Plan, new fluid mineral leases would require a no surface occupancy stipulation in priority habitat and controlled surface use and timing restrictions in general habitat. New leases would be prioritized in non-habitat first and then in the least suitable habitat for GRSG.

For existing leases under the Proposed Plan, leaseholders would be required to avoid and minimize surface disturbing and disruptive activities in priority habitat for leases that are not yet developed. In addition, reclamation plans would be designed to restore habitat to desired conditions described in table 1. Fluid mineral operations would be mitigated in priority habitat to reduce soil compaction to improve vegetation reestablishment and keep GRSG habitat disturbance to a minimum.

Surface disturbances would also be prohibited for unleased coal mines in priority habitat as well as other mitigation measures to reduce disturbances for leased coal mines and associated facilities. Locatable mineral, non-energy leasable, and mineral material operations in priority habitat would be mitigated to protect GRSG habitat.

Minerals management direction under the Proposed Plan would have positive impacts for livestock grazing in priority and general GRSG habitats because development and surface disturbance would be limited, and the potential from development related disturbance of rangeland and forage resources would be reduced. However, impacts from new and existing mineral leases could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Utah – Forest Service Proposed Plan Amendment Livestock Grazing Effects Analysis

Proposed Plan

Grazing management under the Proposed Plan on National Forest System (NFS) lands would be determined at the Forest unit level in order to achieve desired conditions and meet grazing use guidelines in GRSG seasonal habitats. Impacts to livestock grazing generally depend on current and site-specific biophysical conditions, livestock numbers, timing and duration of use, livestock management practices, range development and improvement levels, and permittee responsibilities, which are not easily addressed at the programmatic level. As a result, impacts on livestock grazing management would vary at a site-specific level and are described broadly for the Proposed Plan at the planning-unit scale.

Impacts from General GRSG Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would be managed to maintain residual herbaceous grass height for overhead and lateral concealment for GRSG nesting and early brood rearing life stages. Wet meadows and riparian areas would be managed to sustain a rich diversity of perennial forb species relative to site potential, and winter habitat would provide sufficient sagebrush height and density for food and cover for GRSG during this seasonal period.

Management to achieve these desired conditions would directly impact livestock grazing on NFS lands. These impacts could include modification of grazing strategies or rotation schedules, changes to duration and/or the season of use, changes to the kind and class of livestock, or reduction of livestock numbers. These modifications could result in the reduction of AUMs on some allotments. Management to achieve these desired conditions would also impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation.

Indirectly, implementation of management direction to achieve desired conditions in GRSG seasonal habitat as described in table 1 could be beneficial to livestock grazing in the long-term, particularly on allotments where rangeland conditions could be improved, by implementing management direction that improves rangeland conditions. Improved rangeland condition could also contribute to increased forage production.

Table 1. Seasonal Habitat Desired Conditions for GRSG.

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks. [4]		
Lek Security	Proximity of trees [5]	Trees or other tall structures are none to uncommon within 1.86 miles of leks [6,7]

ATTRIBUTE	INDICATORS	DESIRED CONDTION
	Proximity of sagebrush to leks [6]	Adjacent protective sagebrush cover within 328 feet of lek [6]
Cover	Seasonal habitat extent [7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [6,7,8]	15 to 25%
	Sagebrush height [7]	
	Arid sites [6,7,9]	12 to 32 inches
	Mesic sites[6,7,10]	16 to 32 inches
	Predominant sagebrush shape [6]	>50% in spreading [11]
	Perennial grass canopy cover [6,7]	
	Arid sites [7,9]	≥10%
	Mesic sites [7,10]	≥15%
	Perennial grass height [6,7,8]	Provide overhead and lateral concealment from predators [7]
	Perennial forb canopy cover [6,7,8]	
	Arid sites [9]	≥5%[6,7]
	Mesic sites [10]	≥10%[6,7]
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)		
Cover	Seasonal habitat extent [7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height [7,8]	16 to 32 inches
	Perennial grass canopy cover and forbs [7,8]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability [6,7]	Preferred forbs are common with several preferred species present [13]
WINTER[1] (Seasonal Use Period November 1-February 28)		
Cover and Food	Seasonal habitat extent [6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow [6,7,8]	>10%
	Sagebrush height above snow [6,7,8]	>10 inches [14]

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.

[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.

[4] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.

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[6] Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl, eds. 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.

[7] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.

[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.

[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (HAF 2014).

[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (HAF 2014).

[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (HAF 2014).

[12] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.

[13] Preferred forbs are listed in HAF Table III-2 (HAF 2014). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

Impacts from Adaptive Management

Adaptive management measures under the Proposed Plan could have direct impacts on livestock grazing if it is determined that domestic livestock grazing is a causal factor in the deviation from GRSG conservation objectives. These impacts could include the cessation of livestock grazing or modification of numbers or season of use, which would reduce AUMs.

Impacts from Lands and Realty Management

Under the Proposed Plan, special use authorizations, land ownership adjustments, and land withdrawals would be restricted or mitigated to avoid or reduce adverse impacts to GRSG in priority and general habitat. This management direction would limit the direct and indirect impacts of development and surface disturbance on rangelands where livestock grazing is permitted. However, impacts could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Wind and Solar

Management direction prohibiting solar and wind development in priority habitat and imposing restrictions on development in general habitat would limit any impacts associated with ground disturbances from development of these resources. This management direction would limit the direct impacts of development and surface disturbances on existing rangelands, which would be beneficial to livestock grazing. However, this may shift impacts in areas outside of priority and general GRSG habitats, which could indirectly impact rangelands and grazing conditions through increased development.

Impacts from GRSG Habitat Management

Restoration activities under this alternative that reduce invasive annual grasses and other invasive plant species, conifers, and the spread and intensity of wildfire in GRSG seasonal habitats would be beneficial to livestock grazing because these activities will improve rangeland conditions and increase forage production in the long-term. Restrictions that temporarily close areas to grazing could impact permittees and operations in the short-term.

Impacts from Livestock Grazing Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would also be managed in order to maintain residual perennial grass height to provide for adequate GRSG nesting cover according to the guidelines described in table 2.

Current direction for livestock grazing use in most Forest Plans in the planning areas is generally less restrictive than direction described under the Proposed Plan (Table 3). Therefore, grazing use guidelines under the Proposed Plan would directly impact livestock grazing management on NFS lands. Impacts could include modification of grazing strategies or rotation schedules, changes to the season of use, changes to kind and class of livestock, closure of a portion of an allotment, or reduction of livestock numbers. Implementation of this management direction could result in the reduction of AUMs on some allotments.

Table 2. Proposed Plan Grazing Guidelines for GRSG Seasonal Habitat.

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] within 4 miles of occupied leks	Perennial grass height: [2] When grazing occurs during breeding and nesting season (March 1 to June 15) manage

	for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (June 16 to October 30) manage for 4 inches [4,5,6] of perennial grass height.
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation [7,8]
Winter [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of GRSG see table 1.

[2] Grass heights only apply in breeding and nesting habitat with ≥10% sagebrush cover to support nesting.

[3] Holloran et al. 2005 *GRSG nesting habitat selection and success in Wyoming*.

[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).

[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of GRSG Centrocercus urophasianus nesting and brood-rearing habitats*. Wildlife Biology 13(1): 42-50.

[6] Stubble height to be measured at the end of the growing season.

[7] Crawford et al. 2004. Ecology and Management of GRSG and GRSG habitat. "In riparian brood-rearing habitat, GRSG prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth
stimulated by moderate livestock grazing (Neel 1980, Evans 1986). "Moderate use equates to a 10-cm residual stubble height for most grasses and sedges."

[8] Stubble height to be measured in the meadow areas used by GRSG for brood-rearing (not on the hydric greenline).

Table 3. Current Land and Resource Management Plan (Forest Plan) direction for livestock grazing use.

Forest Plan	**Existing Upland Use Level[1]**	**Existing Riparian Use Level[1]**
Ashley	None (Defers to AMP)	▪ 50% Browse[2]
Dixie	50% - 60%	▪ 50% - 60% ▪ 50% Browse
Fishlake	40% - 60%	▪ 1.5" – 6" SH[3] ▪ 40% - 50% Browse
Manti-La Sal	40% - 65%	▪ 30% - 60% ▪ 4"- 5" SH
Sawtooth	40% - 50%	▪ 45% or 4" SH
Uinta	▪ 40% - 60% ▪ 6"- 7" SH[4]	▪ 35% - 65% ▪ 2"- 6" SH ▪ 6"- 7" SH[4] ▪ 35% - 50% Browse
Wasatch-Cache	▪ 50% - 60% ▪ 50% Browse	▪ 30% - 60% ▪ 3"- 5" SH ▪ 50% Browse

[1] As described in the current Land Resource Management Plan. Ranges vary according to grazing system (e.g., rest or deferred), season of use (e.g., early or late), range condition (e.g., satisfactory or unsatisfactory), vegetation type (e.g., alpine or non-native seeding), or other categories (e.g., greenline, key area, age class).

[2] Annual utilization of current year's growth of woody vegetation

[3] SH – Stubble Height

[4] Applies to GRSG breeding habitat through June 15 in the Vernon and Strawberry Reservoir Management Areas respectively.

Implementation of these guidelines could also directly impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation. Impacts would occur at the allotment scale as management direction is incorporated into permits, allotment management plans, and annual operating instructions. Management direction for livestock grazing under the Proposed Plan could decrease grazing in some allotments, and possibly overall operation viability. The level and intensity of impacts could vary on a site specific basis with permitted grazing likely decreasing moderately over time as permits are modified to achieve desired conditions and meet annual grazing use guidelines.

Grazing use guidelines under the Proposed Plan would impact about XXX allotments, XXX total acres, and XXX total AUMs in nesting and brood rearing habitats. Grazing use guidelines that limit forage use to 7 inches for perennial grasses during nesting season and 4 inches post nesting season would impact about XXX acres in nesting habitat within active grazing allotments (Table 4).

Table 4. Grazing Allotment Acres and AUMs intersecting GRSG Seasonal Habitat on National Forests within the EIS planning area.

Forest/Grassland	Allotment Acres in Nesting Habitat[1]	Allotment Acres In Brood Rearing/Summer Habitat[2]	Allotments in Nesting and Brood Rearing/Summer Habitat	Total AUMs for Allotments in Nesting and Brood Rearing/Summer Habitat[3]
Ashley	[4]	[4]	[4]	
Dixie				
Fishlake				
Manti-La Sal				
Sawtooth				
Uinta-Wasatch-Cache	[4]	[4]	[4]	

[1] Acres in active allotments with permitted dates during nesting season that intersect nesting habitat and have greater than 200 acres in occupied GRSG habitat.

[2] Acres in active allotments with permitted dates during brood rearing/summer season that intersect brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[3] Total AUMs for active allotments with permitted dates during nesting and brood rearing/summer season that intersect nesting and brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[4] Acres in Wyoming on the Ashley and Uinta-Wasatch-Cache National Forests

Under the Proposed Plan sheep camps would not be located within 1.2 miles from the perimeter of a lek during lekking season and trailing of livestock during breeding and nesting seasons would be minimized during breeding and nesting seasons. This management direction would result in the need to modify grazing practices with increased costs for permittees in these areas.

Additional constraints under the Proposed Plan would also apply to structural range improvements in priority GRSG habitat compared to current plan direction. These include prohibiting fence construction or reconstruction within 1.2 miles from the perimeter of occupied leks unless the collision risk can be mitigated through design features or markings, not constructing new permanent livestock facilities (e.g., windmills, water tanks, corrals) within 1.2 miles from the perimeter of occupied leks, and not constructing water developments in priority habitat unless they are beneficial to GRSG.

Prohibitions on new structural improvements could limit the ability of permittees to effectively distribute livestock resulting in increases in time and costs to permittees and potentially the full use permitted AUMs. Although these constraints could increase the amount of time permittees spend to manage livestock on NFS lands, it should allow sufficient flexibility that permittees could continue to utilize structural range improvements to effectively distribute livestock.

Under the Proposed Plan, the Forest Service would consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities as opportunities arise where removal of livestock would enhance the ability to achieve desired habitat conditions as described in table 1. These actions would occur according to applicable regulations and, if implemented, would result in the reduction of overall available AUMs.

Managing livestock grazing to achieve the desired conditions in table 1 and livestock use guidelines in table 3 may indirectly benefit rangeland conditions by increasing vegetation productivity and increasing forage in the long term. This in turn would provide managers and permittees better management options, especially on those allotments where livestock numbers are approaching a sustainability threshold or during drought and other disturbances such as wildfire.

Impacts from Fire Management

Under the Proposed Plan, measures to protect GRSG habitat from fire and associated fire operations would be beneficial to livestock grazing, especially in the 12-inch or less precipitation zone, because it would help prevent expansion of non-native invasive species such as cheatgrass. Although management to suppress and control the spread of wildfire under the Proposed Plan would decrease the risk of disturbance from wildfire in GRSG habitat, fires outside of GRSG habitat would possibly be at risk of decreased suppression efforts. Management direction to protect GRSG habitat from fire in higher elevation sagebrush habitats (i.e., mountain big sagebrush) could indirectly negatively impact livestock grazing in the long-term as sagebrush potentially increases and forage production decreases.

Impacts from Wild Horse and Burro Management

Under Proposed Plan, wild horse and burro populations should be managed within appropriate management levels, or adjusted, to restore, enhance, or maintain GRSG desired habitat conditions as described in table 1. This management direction would be beneficial to livestock grazing in the long-term by increasing vegetation productivity and increasing forage production, particularly where rangeland conditions could be improved.

Impacts from Recreation Management

Under the Proposed Plan new recreation special use authorizations and expansion of special use authorizations would be restricted in priority habitat management areas. In addition, terms and conditions that that protect or restore GRSG habitat would be included in new special use authorizations and existing permits and operating plans would be modified to protect and/or restore GRSG habitat. Temporary recreation uses that result in the loss of GRSG habitat would not be authorized, and new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, campgrounds) would not be approved in priority habitat unless the development results in a net conservation gain to GRSG and/or their habitats.

This management direction would limit the direct and indirect impacts of recreation development on rangelands where livestock grazing is permitted. This management direction would have beneficial impacts to livestock grazing by reducing disturbances to rangelands from development and disturbances to livestock. However, impacts from recreation management could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Road/Transportation Management

Under the Proposed Plan new road or trail and construction would be prohibited in GRSG habitat, and road construction within riparian and mesic meadows would be restricted. This direction would be beneficial to livestock grazing by reducing impacts from roads rangeland and riparian areas. This could indirectly improve forage production and improve overall rangeland conditions. However, impacts from roads and transportation could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Minerals Management

Under the Proposed Plan, new fluid mineral leases would require a no surface occupancy stipulation in priority habitat and controlled surface use and timing restrictions in general habitat. New leases would be prioritized in non-habitat first and then in the least suitable habitat for GRSG.

For existing leases under the Proposed Plan, leaseholders would be required to avoid and minimize surface disturbing and disruptive activities in priority habitat for leases that are not yet developed. In addition, reclamation plans would be designed to restore habitat to desired conditions described in table 1. Fluid mineral operations would be mitigated in priority habitat to reduce soil compaction to improve vegetation reestablishment and keep GRSG habitat disturbance to a minimum.

Surface disturbances would also be prohibited for unleased coal mines in priority habitat as well as other mitigation measures to reduce disturbances for leased coal mines and associated facilities. Locatable mineral, non-energy leasable, and mineral material operations in priority habitat would be mitigated to protect GRSG habitat.

Minerals management direction under the Proposed Plan would have positive impacts for livestock grazing in priority and general GRSG habitats because development and surface disturbance would be limited, and the potential from development related disturbance of rangeland and forage resources would be reduced. However, impacts from new and existing mineral leases could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Wyoming – Forest Service Proposed Plan Amendment Livestock Grazing Effects Analysis

Proposed Plan

Grazing management under the Proposed Plan on National Forest System (NFS) lands would be determined at the Forest unit level in order to achieve desired conditions and meet grazing use guidelines in GRSG seasonal habitats. Impacts to livestock grazing generally depend on current and site-specific biophysical conditions, livestock numbers, timing and duration of use, livestock management practices, range development and improvement levels, and permittee responsibilities, which are not easily addressed at the programmatic level. As a result, impacts on livestock grazing management would vary at a site-specific level and are described broadly for the Proposed Plan at the planning-unit scale.

Impacts from General GRSG Management

Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would be managed to maintain residual herbaceous grass height for overhead and lateral concealment for GRSG nesting and early brood rearing life stages. Wet meadows and riparian areas would be managed to sustain a rich diversity of perennial forb species relative to site potential, and winter habitat would provide sufficient sagebrush height and density for food and cover for GRSG during this seasonal period.

Management to achieve these desired conditions would directly impact livestock grazing on NFS lands. These impacts could include modification of grazing strategies or rotation schedules, changes to duration and/or the season of use, changes to the kind and class of livestock, or reduction of livestock numbers. These modifications could result in the reduction of AUMs on some allotments. Management to achieve these desired conditions would also impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation.

Indirectly, implementation of management direction to achieve desired conditions in GRSG seasonal habitat as described in table 1 could be beneficial to livestock grazing in the long-term, particularly on allotments where rangeland conditions could be improved, by implementing management direction that improves rangeland conditions. Improved rangeland condition could also contribute to increased forage production.

Table 1. Seasonal Habitat Desired Conditions for GRSG.

ATTRIBUTE	INDICATORS	DESIRED CONDITION
AREAS MANAGED FOR BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 15-June 30) Apply 5.3 miles from occupied leks. [4]		
Lek Security	Proximity of trees[5]	Trees or other tall structures are none to uncommon within 1.86 miles of leks[6,7]

ATTRIBUTE	INDICATORS	DESIRED CONDITION
	Proximity of sagebrush to leks[6]	Adjacent protective sagebrush cover within 328 feet of lek[6]
Cover	Seasonal habitat extent[7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [6,7,8]	15 to 25%
	Sagebrush height[7]	
	Arid sites[7,9]	8 to 32 inches in black sage and 12 to 32 inches in all other areas
	Mesic sites[7,10]	All Wyoming NFs: 16 to 32 inches
	Predominant sagebrush shape[6]	>50% in spreading[11]
	Perennial grass canopy cover [6, 7]	
	Arid sites[6,7,9]	≥10%
	Mesic sites[6,7,10]	≥15%
	Perennial grass height[6,7,8]	Provide overhead and lateral concealment from predators[6]
	Perennial forb canopy cover [6,7,8]	
	Arid sites[9]	≥5%[6,7]
	Mesic sites[10]	≥10%[6,7]
AREAS MANAGED FOR BROOD-REARING/SUMMER[1] (Seasonal Use Period July 1-November 30)		
Cover	Seasonal habitat extent[7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height[7,8]	8 to 20 inches in black sage and 12 to 32 inches in all other areas
	Perennial grass canopy cover and forbs [7,8]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability[6,7]	Preferred forbs are common with several preferred species present[13]
WINTER[1] (Seasonal Use Period December 1-March 14)		
Cover and Food	Seasonal habitat extent[6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow[6,7,8]	>10%
	Sagebrush height above snow[6,7,8]	>10 inches[14]

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.

[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.

[4] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 5.3 miles is not appropriate.

[5] Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.

[6] Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. *Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies,* Technical Reference XXXX -X. U.S. Bureau of Land Management, Denver, Colorado. Submitted for publication.

[7] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.

[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.

[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (HAF 2014).

[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (HAF 2014).

[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (HAF 2014).

[13] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.

[13] Preferred forbs are listed in HAF Table III-2 (HAF 2014). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

Impacts from Adaptive Management
Adaptive management measures under the Proposed Plan could have direct impacts on livestock grazing if it is determined that domestic livestock grazing is a causal factor in the deviation from GRSG conservation objectives. These impacts could include the cessation of livestock grazing or modification of numbers or season of use, which would reduce AUMs.

Impacts from Lands and Realty Management
Under the Proposed Plan, special use authorizations, land ownership adjustments, and land withdrawals would be restricted or mitigated to avoid or reduce adverse impacts to GRSG in priority and general habitat. This management direction would limit the direct and indirect impacts of development and surface disturbance on rangelands where livestock grazing is permitted. However, impacts could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Wind and Solar
Management direction prohibiting solar and wind development in priority habitat and imposing restrictions on development in general habitat would limit any impacts associated with ground disturbances from development of these resources. This management direction would limit the direct impacts of development and surface disturbances on existing rangelands, which would be beneficial to livestock grazing. However, this may shift impacts in areas outside of priority and general GRSG habitats, which could indirectly impact rangelands and grazing conditions through increased development.

Impacts from GRSG Habitat Management
Restoration activities under this alternative that reduce invasive annual grasses and other invasive plant species, conifers, and the spread and intensity of wildfire in GRSG seasonal habitats would be beneficial to livestock grazing because these activities will improve rangeland conditions and increase forage production in the long-term. Restrictions that temporarily close areas to grazing could impact permittees and operations in the short-term.

Impacts from Livestock Grazing Management
Under the Proposed Plan on NFS lands, livestock grazing would be managed to achieve or maintain desired conditions in GRSG seasonal habitats as described in table 1. Livestock grazing would also be managed in order to maintain residual perennial grass height to provide for adequate GRSG nesting cover according to the guidelines described in table 2.

Current direction for livestock grazing use in most Forest Plans in the planning areas is generally less restrictive than direction described under the Proposed Plan (Table 3). Therefore, grazing use guidelines under the Proposed Plan would directly impact livestock grazing management on NFS lands. Impacts could include modification of grazing strategies or rotation schedules, changes to the season of use, changes to kind and class of livestock, closure of a portion of an allotment, or reduction of livestock numbers. Implementation of this management direction could result in the reduction of AUMs on some allotments.

Table 2. Proposed Plan Grazing Guidelines for GRSG Seasonal Habitat.

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] within 5.3 miles of occupied leks	Perennial grass height: [2] When grazing occurs during breeding and nesting season (March 15 to June 30) manage for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (July 1 to November 30) manage for 4 inches [4,5,6] of perennial grass height.
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation [7,8]
Winter [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of GRSG see table 1.

[2] Grass heights only apply in breeding and nesting habitat with ≥10% sagebrush cover to support nesting.

[3] Holloran et al. 2005 *GRSG nesting habitat selection and success in Wyoming*.

[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).

[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of GRSG Centrocercus urophasianus nesting and brood-rearing habitats*. Wildlife Biology 13(1): 42-50.

[6] Stubble height to be measured at the end of the growing season.

[7] Crawford et al. 2004. Ecology and Management of GRSG and GRSG habitat. "In riparian brood-rearing habitat, GRSG prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth stimulated by moderate livestock grazing (Neel 1980, Evans 1986). "Moderate use equates to a 10-cm residual stubble height for most grasses and sedges."

[8] Stubble height to be measured in the meadow areas used by GRSG for brood-rearing (not on the hydric greenline).

Table 3. Current Land and Resource Management Plan (Forest Plan) direction for livestock grazing use.

Forest/Grassland Plan	**Existing Upland Use Level[1]**	**Existing Riparian Use Level[1]**
Ashley	None (Defers to AMP)	▪ 50% Browse[2]
Bridger-Teton	40% - 60%	▪ 45% - 65%
Caribou	35% - 55%	▪ 4"- 6" SH
Targhee	35% - 55%	▪ 4" SH ▪ 30% Browse
Medicine Bow	0% - 55%	▪ 3"- 6" SH
Routt	0% - 55%	▪ 4"- 6" SH
Thunder Basin	None (Defers to AMP)	None (Defers to AMP)
Uinta	▪ 40% - 60% ▪ 6"- 7" SH[4]	▪ 35% - 65% ▪ 2"- 6" SH ▪ 6"- 7" SH[4] ▪ 35% - 50% Browse
Wasatch-Cache	▪ 50% - 60% ▪ 50% Browse	▪ 30% - 60% ▪ 3"- 5" SH ▪ 50% Browse

[1] As described in the current Land Resource Management Plan. Ranges vary according to grazing system (e.g., rest or deferred), season of use (e.g., early or late), range condition (e.g., satisfactory or unsatisfactory), vegetation type (e.g., alpine or non-native seeding), or other categories (e.g., greenline, key area, age class).

[2] Annual utilization of current year's growth of woody vegetation

[3] SH – Stubble Height

[4] Applies to GRSG breeding habitat through June 15 in the Vernon and Strawberry Reservoir Management Areas respectively.

Implementation of these guidelines could also directly impact permittees by increasing the amount of time permittees spend to manage livestock on NFS lands as well as the total costs to a livestock operation. Impacts would occur at the allotment scale as management direction is incorporated into permits, allotment management plans, and annual operating instructions. Management direction for livestock grazing under the Proposed Plan could decrease grazing in some allotments, and possibly overall operation viability. The level and intensity of impacts could vary on a site specific basis with permitted grazing likely decreasing moderately over time as permits are modified to achieve desired conditions and meet annual grazing use guidelines.

Grazing use guidelines under the Proposed Plan would impact about XXX allotments, XXX total acres, and XXX total AUMs in nesting and brood rearing habitats. Grazing use guidelines that limit forage use to 7 inches for perennial grasses during nesting season and 4 inches post nesting season would impact about XXX acres in nesting habitat within active grazing allotments (Table 4).

Table 4. Grazing Allotment Acres and AUMs intersecting GRSG Seasonal Habitat on National Forests and Grasslands within the EIS planning area.

Forest/Grassland	Allotment Acres in Nesting Habitat[1]	Allotment Acres In Brood Rearing/Summer Habitat[2]	Allotments in Nesting and Brood Rearing/Summer Habitat	Total AUMs for Allotments in Nesting and Brood Rearing/Summer Habitat[3]
Ashley	4	4	4	
Bridger-Teton				
Caribou-Targhee				
Medicine Bow				
Routt[5]				
Thunder Basin[5]				
Uinta- Wasatch-Cache	4	4	4	

[1] Acres in active allotments with permitted dates during nesting season that intersect nesting habitat and have greater than 200 acres in occupied GRSG habitat.

[2] Acres in active allotments with permitted dates during brood rearing/summer season that intersect brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[3] Total AUMs for active allotments with permitted dates during nesting and brood rearing/summer season that intersect nesting and brood rearing habitat and have greater than 200 acres in occupied GRSG habitat.

[4] Acres in Wyoming on the Ashley and Uinta-Wasatch-Cache National Forests

[5] Routt and Thunder Basin National Grassland listed separately from the Medicine Bow-Routt National Forest to identify information specific to the Routt and Thunder Basin portion of the Forest in northwest Colorado and Wyoming respectively.

Under the Proposed Plan sheep camps would not be located within 1.2 miles from the perimeter of a lek during lekking season and trailing of livestock during breeding and nesting seasons would be minimized during breeding and nesting seasons. This management direction would result in the need to modify grazing practices with increased costs for permittees in these areas.

Additional constraints under the Proposed Plan would also apply to structural range improvements in priority-core GRSG habitat management areas compared to current plan direction. These include prohibiting fence construction or reconstruction within 4 miles from the perimeter of occupied leks unless the collision risk can be mitigated through design features or markings, not constructing new permanent livestock facilities (e.g., windmills, water tanks, corrals) within 0.6 miles in priority and 0.25 in general from the perimeter of occupied leks.

Prohibitions on new structural improvements could limit the ability of permittees to effectively distribute livestock resulting in increases in time and costs to permittees and potentially the full use permitted AUMs. Although these constraints could increase the amount of time permittees spend to manage livestock on NFS lands, it should allow sufficient flexibility that permittees could continue to utilize structural range improvements to effectively distribute livestock.

Under the Proposed Plan, the Forest Service would consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities as opportunities arise where removal of livestock would enhance the ability to achieve desired habitat conditions as described in table 1. These actions would occur according to applicable regulations and, if implemented, would result in the reduction of overall available AUMs.

Managing livestock grazing to achieve the desired conditions in table 1 and livestock use guidelines in table 3 may indirectly benefit rangeland conditions by increasing vegetation productivity and increasing forage in the long term. This in turn would provide managers and permittees better management options, especially on those allotments where livestock numbers are approaching a sustainability threshold or during drought and other disturbances such as wildfire.

Impacts from Fire Management

Under the Proposed Plan, measures to protect GRSG habitat from fire and associated fire operations would be beneficial to livestock grazing, especially in the 12-inch or less precipitation zone, because it would help prevent expansion of non-native invasive species such as cheatgrass. Although management to suppress and control the spread of wildfire under the Proposed Plan would decrease the risk of disturbance from wildfire in GRSG habitat, fires outside of GRSG habitat would possibly be at risk of decreased suppression efforts. Management direction to protect GRSG habitat from fire in higher elevation sagebrush habitats (i.e., mountain big sagebrush) could indirectly negatively impact livestock grazing in the long-term as sagebrush potentially increases and forage production decreases.

Impacts from Wild Horse and Burro Management

Under Proposed Plan, wild horse and burro populations should be managed within appropriate management levels, or adjusted, to restore, enhance, or maintain GRSG desired habitat conditions as described in table 1. This management direction would be beneficial to livestock grazing in the long-term by increasing vegetation productivity and increasing forage production, particularly where rangeland conditions could be improved.

Impacts from Recreation Management

Under the Proposed Plan new recreation special use authorizations and expansion of special use authorizations would be restricted in priority habitat management areas. In addition, terms and conditions that that protect or restore GRSG habitat would be included in new special use authorizations and existing permits and operating plans would be modified to protect and/or restore GRSG habitat. Temporary recreation uses that result in the loss of GRSG habitat would not be authorized, and new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, campgrounds) would not be approved in priority habitat unless the development results in a net conservation gain to GRSG and/or their habitats.

This management direction would limit the direct and indirect impacts of recreation development on rangelands where livestock grazing is permitted. This management direction would have beneficial impacts to livestock grazing by reducing disturbances to rangelands from development and disturbances to livestock. However, impacts from recreation management could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Road/Transportation Management

Under the Proposed Plan new road or trail and construction would be prohibited in GRSG habitat, and road construction within riparian and mesic meadows would be restricted. This direction would be beneficial to livestock grazing by reducing impacts from roads rangeland and riparian areas. This could indirectly improve forage production and improve overall rangeland conditions. However, impacts from roads and transportation could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

Impacts from Minerals Management

Under the Proposed Plan, new fluid mineral leases would require a no surface occupancy stipulation in priority habitat and controlled surface use and timing restrictions in general habitat. New leases would be prioritized in non-habitat first and then in the least suitable habitat for GRSG.

For existing leases under the Proposed Plan, leaseholders would be required to avoid and minimize surface disturbing and disruptive activities in priority habitat for leases that are not yet developed. In addition, reclamation plans would be designed to restore habitat to desired conditions described in table 1. Fluid mineral operations would be mitigated in priority habitat to reduce soil compaction to improve vegetation reestablishment and keep GRSG habitat disturbance to a minimum.

Surface disturbances would also be prohibited for unleased coal mines in priority habitat as well as other mitigation measures to reduce disturbances for leased coal mines and associated facilities. Locatable mineral, non-energy leasable, and mineral material operations in priority habitat would be mitigated to protect GRSG habitat.

Minerals management direction under the Proposed Plan would have positive impacts for livestock grazing in priority and general GRSG habitats because development and surface disturbance would be limited, and the potential from development related disturbance of rangeland and forage resources would be reduced. However, impacts from new and existing mineral leases could be disproportionately concentrated in areas outside of priority and general GRSG habitats, which could indirectly impact grazing conditions through increased development.

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Monday, August 11, 2014 2:32 PM
To: Uriarte, Alex
CC: ICF_SGSE
Subject: Fwd: First comments
Attachments: W_Socio_ImpactMethodology_20140707_V2_JSP.docx

Attached AND below are Julie's comments on method appendix. Disregard first comment below.

Josh

---------- Forwarded message ----------
From: **Julie Suhr Pierce** <jsuhrpierce@blm.gov>
Date: Tue, Jul 8, 2014 at 3:00 PM
Subject: First comments
To: Joshua Sidon <jsidon@blm.gov>

Josh,

I don't have any specific comments on the data document. In the methodology document, I found a few things (which I'm sure others are aware of) that need attention. The footers need to be checked for any necessary corrections: the appendix letter in the pagination changes in some footers, and the date varies from October 2013 to June 2013…should all be June or July 2014?

I would like to see a time-frame added to the employment effects tables for the well drilling and completion as well as for wind turbine construction. Showing the number of jobs without a number of months or years of employment might be misunderstood by some readers as being long-term employment impacts.

On page R-16 (W-16), the right-hand column figure for the assessed value of federal royalties ($140,816,813) appears to need a negative sign to be added in front of it. When I have a few minutes, I'll go through all of the tables again to look for any other possible issues like that.

In general, I think the additions and edits read well and accomplish what ICF had stated as their planned objectives. I'll be away for the next hour but then will dig into the Chapter 3 and Chapter 4 sections.

Julie

Julie A. Suhr Pierce, Ph.D.

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Appendix W

Economic Impact Analysis Methodology

APPENDIX W
ECONOMIC IMPACT ANALYSIS METHODOLOGY

INTRODUCTION

This appendix describes the methods and data that underlie the economic impact modeling analysis. Input-output models such as the Impact Analysis for Planning (IMPLAN) model, an economic impact analysis model, provide a quantitative representation of the production relationships between individual economic sectors. Thus, the economic modeling analysis uses information about physical production quantities and the prices and costs for goods and services. The inputs required to run the IMPLAN model are described in the following narrative and tables. The resulting estimates from the IMPLAN model, by alternative, are in **Chapter 4**, Environmental Consequences, **Section 4.22**, Social and Economic Impacts (Including Environmental Justice). The first portion of the following information describes general aspects of the IMPLAN model and how it was used to estimate economic impacts. The remaining sections provide additional detailed data used in the analysis for livestock grazing, oil and gas, coal and wind energy.

THE IMPLAN MODEL

IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the ripple effect (also called the multiplier effect) of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly impacted) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production). Because IMPLAN incorporates regional trade data, it is able to separate the economic impact received by a specific region from the impact that is felt beyond the selected geographic area. The estimates reported below for output, employment and earnings reflect only the share supported in the primary and secondary study areas.

This analysis used IMPLAN 2011. This means that parameters such as productivity and trade data reflect estimates for the study area released in the 2011 IMPLAN version. These parameters typically do not meaningfully change from one year to another and would likely not be substantially affected by more recent growth trends in employment or output in specific sectors. Prior to running the model, cost and price data were converted to a consistent dollar year (2011) using sector-specific adjustment factors from the IMPLAN model. Unless stated otherwise, t~~T~~he values in this appendix are expressed in year 2011 dollars.

The current IMPLAN model has 440 economic sectors, of which 331 are represented in the Primary and 384 are represented in the Secondary Socioeconomic Study Area counties. This analysis involved direct changes in economic activity for 38 IMPLAN economic sectors, as well as changes in all other related sectors due to the ripple effect. The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the Primary and Secondary Socioeconomic Study Areas. As a result, the calibrated model does a better job of generating multipliers and the subsequent impacts that reflect the interaction between and among the sectors in the Primary and Secondary Socioeconomic Study Areas compared to a model using unadjusted national coefficients.

Key variables used in the IMPLAN model were filled in using data specific to the Primary and Secondary Socioeconomic Study Areas, including employment estimates, labor earnings, and total industry output. This data was used to estimate labor productivity and earnings per job. As explained above, recent growth trends in employment and output in specific sectors in the study area would not likely affect these parameters.

The trade data available in the current version of IMPLAN (Version 3.0) make it possible to do multi-region analysis to track how an impact on any of the IMPLAN sectors in the study area affects production in any of the sectors in any other region of the US. For this analysis, this feature allowed the estimation of how an impact in the primary study area disperses into the secondary study area, and how these effects in the secondary study area create additional local effects in the primary study area. As a result, it was possible to estimate not only the jobs and income generation in the primary study area, but to also estimate how the economic activity in the primary study area affected jobs and income generation in the secondary study area.

In addition to analyzing impacts in the primary and secondary study area, BLM and USFS analyzed impacts to smaller regions, where socioeconomic impacts associated with oil and gas, wind energy and coal would likely be concentrated. No similar analysis was done for livestock grazing, given the relatively disperse socioeconomic impacts of althernatives through effects on livestock grazing.

LIVESTOCK GRAZING

Economic impacts from changes to livestock grazing are a function of the amount of forage available and the economic value of forage.

Forage availability was measured in animal unit months (AUMs), with one AUM defined as the amount of forage needed to feed a cow, one horse, or five sheep for one month. For Forest Service data, measurements in AUMs were also obtained. Data were obtained from the BLM's Rangeland Administration System (BLM 2012a) and from the Forest Service's INFRA range module (Forest Service 2013). Two types of AUM measures were used: Active AUMs and Billed AUMs. Active AUMs measure the amount of forage from land available for grazing. The Forest Service designates this measure "permitted" AUMs. Billed AUMs measure the amount of forage that the BLM and Forest Service bill for annually. The Forest Service uses the designation "authorized" AUMs. Impacts were estimated for the range between billed and active AUMs.

Data for Alternatives A, B, D and E were for 2011. Estimates of Active and Billed AUMs under Alternative C1 were obtained by using GIS to remove AUMs intersecting with sage-grouse habitat. In doing so, all allotments containing sage grouse habitat were considered closed for grazing (and not just the portion with sage grouse habitat). Estimates for Active and Billed AUMs for Alternative C2 assume 60 percent of the AUMs made unavailable under Alternative C1 are made unavailable under Alternative C2. **Section 4.22** discusses the possibility of Billed AUMs not being reduced in proportion to reductions in Active AUMs under Alternatives C1 and C2.

Table W.1, below, shows estimated Animal Unit Months by management unit under each Alternative. Data for National Forests corresponds only to AUMs in the portion of those National Forests within the study area and with sage-grouse habitat.~~habitat.~~

Table W.1~~1~~
Estimated Annual Animal Unit Months on Federal Lands, 2011

	Active			Billed		
	Alternative A, B, D and E	Alternative C1	Alternative C2	Alternative A, B, D and E	Alternative C1	Alternative C2
Cedar City FO	139,816	66,229	110,381	88,432~~95,643~~	37,828~~45,039~~	68,190~~75,401~~
Fillmore FO	256,674	229,493	245,802	152,760~~165,696~~	128,418~~141,354~~	143,023~~155,959~~
GSENM	76,816	74,896	76,048	38,464~~30,153~~	36,950~~28,639~~	37,858~~29,547~~
Kanab FO	18,686	9,695	15,090	9,189~~5,937~~	3,933~~681~~	7,086~~3,834~~
Moab FO	89,648	89,648	89,648	46,957~~53,981~~	46,957~~53,981~~	46,957~~53,981~~
Price FO	100,375	87,530	95,237	51,434~~59,536~~	45,111~~53,213~~	48,905~~57,007~~
Richfield FO	98,462	83,032	92,290	66,371~~79,760~~	55,209~~68,598~~	61,906~~75,295~~
Salt Lake FO	176,398	78,370	137,187	137,686~~153,381~~	57,011~~72,706~~	105,416~~121,111~~
Vernal FO	127,839	36,150	91,163	65,457~~75,407~~	15,652~~25,602~~	45,535~~55,485~~
Sawtooth NF	12,348	0	7,409	12,348	0	7,409
Dixie NF	38,843	0	23,306	38,843	0	23,306
Fishlake NF	69,707	0	41,824	69,707	0	41,824
Manti-Lasal NF	55,561	0	33,337	55,561	0	33,337
Uinta-Wasatch-Cache NF	44,441	0	26,665	44,441	0	26,665
Ashley NF	43,329	0	25,997	43,329	0	25,997

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	Active			Billed		
	Alternative A, B, D and E	Alternative C1	Alternative C2	Alternative A, B, D and E	Alternative C1	Alternative C2
Total	1,348,943	755,043	1,111,383	920,979~~983,723~~	427,069~~489,813~~	723,414~~786,159~~

Sources: Calculated based on data from BLM 2012a and Forest Service 2013. Billed AUMs for Forest Service were assumed equal to active AUMs~~are a 10-year average and, for this reason, may be higher than Active AUMs in 2011~~.

The economic value of forage is estimated based on the value of production associated with the forage. Values for cattle and sheep are estimated separately, and other grazing animals are considered of negligible commercial value.

Due to price fluctuations, average per-AUM values for cattle and sheep are based on the 2002 to 2011 average value of production estimates from the (US Department of Agriculture, Economic Research Service 2012). The value for cattle is $51.19 per AUM, and the value for sheep is $58.01 per AUM in the Primary Socioeconomic Study Area (in 2011 dollars). Including indirect and induced impacts, the value of one AUM in the Primary Socioeconomic Study Area for cattle is $102.12 and for sheep is $127.11 (in 2011 dollars). **Table W.2**, Assumptions for Analysis of Impacts on Output for Livestock Grazing, shows the economic impact assumptions for cattle and sheep. The direct economic impact is the estimated change in livestock output per AUM; IMPLAN generates the indirect and induced impacts.

Table W.3, Assumptions for Analysis of Employment Impacts for Livestock Grazing, provides a summary of the employment impacts that would result, according to IMPLAN, based on unit changes in livestock AUMs.

Table W.2
Assumptions for Analysis of Impacts on Output for Livestock Grazing

Economic Impact	Primary Study Area	Primary and Secondary Study Area
	Cattle	
Direct Economic Impact ($/AUM)	$51.19	$51.19
Indirect Economic Impact ($/AUM)[1]	$44.22	$49.39
Induced Economic Impact ($/AUM)[2]	$6.71	$9.08
Total Economic Impact ($/AUM)	$102.12	$109.66
Multiplier (Total Impact/Direct Impact)	1.99	2.14
	Sheep	
Direct Economic Impact ($/AUM)	$58.01	$58.01
Indirect Economic Impact ($/AUM)[1]	$59.85	$67.76
Induced Economic Impact ($/AUM)[2]	$9.25	$12.53
Total Economic Impact ($/AUM)	$127.11	$138.30
Multiplier (Total Impact/Direct Impact)	2.19	2.38

Note: All dollar values are in 2011 dollars.

[1] Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the livestock industry.

[2] Induced impacts reflect increased demand in the consumer and government sectors.

Table W.3
Assumptions for Analysis of Employment Impacts for Livestock Grazing

Employment Impact	Primary Study Area	Primary and Secondary Study Area
Cattle		
Direct Employment (Jobs/1,000 AUMs)	0.559	0.559
Indirect Employment (Jobs/1,000 AUMs)	0.456	0.486
Induced Employment (Jobs/1,000 AUMs)	0.067	0.087
Total Employment (Jobs/1,000 AUMs)	1.081	1.132
Multiplier (Total Impact/Direct Impact)	1.93	2.03
Average Earnings per Job (2011 dollars)	$36,738	$36,738
Sheep		
Direct Employment (Jobs/1,000 AUMs)	0.980	0.980
Indirect Employment (Jobs/1,000 AUMs)	0.760	0.801
Induced Employment (Jobs/1,000 AUMs)	0.087	0.110
Total Employment (Jobs/1,000 AUMs)	1.827	1.891
Multiplier (Total Impact/Direct Impact)	1.86	1.93
Average Earnings per Job (2011 dollars)	$15,408	$15,408

Note: Direct, indirect, and induced employment impacts and average earnings per job are calculated using IMPLAN.

The IMPLAN sectors used to model and exogenous change in demand for livestock grazing were the following (IMPLAN sector numbers are shown in brackets): grain farming (2), all other crop farming (10), support activities for agriculture and forestry (19), residential structures maintenance and repairs (40), wholesale trade (319), truck transportation (335), banking (354), real estate (360), accounting (368), veterinary services (379), equipment repair and maintenance (417) and labor income (NA). Cattle grazing used the following additional sector: cattle ranching and farming (11). Sheep grazing used the following additional sectors: (animal production except cattle and poulty and eggs (14), retail-food and beverages (324).

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OIL AND GAS

The economic impact of oil and gas reflects drilling, completion, and production activities. Estimation of drilling, completion, and production activities was done for a 15-year period (2014 to 2028). Appendix R, Oil and Gas Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Occupied Habitat in Utah Sub-Region, provides a complete description fo the assumptions and methodology used in developing these estimates.

Commented [AU1]: Comment from Josh Sidon: EMPSi – please ensure we are referencing the correct appendix

The number of wells drilled and the number of wells completed under the No Action Alternative (Alternative A) were based on the average number of wells expected to be drilled or completed per year in each BLM field office's current Reasonable Foreseeable Development Scenario. Completion rates ranged from 10 percent in most counties to 85 percent for oil wells in Carbon and Duchesne counties and for gas wells in Uintah County. Drilling and completion numbers were estimated for federal surface, as well as for all surface ownership.

The BLM oil and gas specialists estimated the share of oil and gas that would intersect with GRSG habitat using GIS. The number of wells completed or drilled that would be affected by each alternative is the number that intersects with GRSG habitat, as appropriate for each alternative:

- Alternative A – Existing areas would be available for fluid mineral leasing
- Alternative B – some GRSG occupied habitat would be designated as priority habitat and would be closed to new fluid mineral leasing
- Alternative C – All GRSG occupied habitat would be designated as priority habitat and would be closed to new fluid mineral leasing
- Alternative D – Some GRSG occupied habitat would be designated as priority habitat but would not be closed to new leasing. Rather, NSO would be placed within 4-miles of an occupied lek
- Alternative E – Based on the State of Utah's Sage-Grouse Management Plan, minor constraints would be placed on management areas.
- Proposed Plan - Some GRSG occupied habitat would be designated as priority habitat but would not be closed to new leasing. Rather, all priority habitat would be managed as NSO.

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Both ~~Only~~ wells in new leases and wells in existing leases were considered to be affected by GRSG management (see Appendix R for details). In addition, the BLM assumed that leases on state and private lands would be affected similarly to federal lands, if large areas of contiguous BLM-administered land are closed to new oil and gas leasing.

Table W.4, Oil and Gas Well Numbers, presents the total number of wells drilled and completed in the Primary Socioeconomic Study Area for each alternative, relative to Alternative A.

Table W. 4
Oil and Gas Well Numbers in New and Existing Leases, Relative to Alternative A

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Item	***Federal, State, and Fee Surface***	***Federal Surface***		***State and Fee Surface***
		New Leases	***Existing Leases***	
Alternative B – Wells Drilled	-329	-115	-165	-49
Alternative B – Wells Completed	-242	-93	-126	-23
Alternative C – Wells Drilled	-858	-270	-494	-94

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Alternative C – Wells Completed	-670	-217	-397	-56
Alternative D – Wells Drilled	-223	-40	-165	-18
Alternative D – Wells Completed	-166	-31	-126	-9
Alternative E – Wells Drilled	0	0	0	0
Alternative E – Wells Completed	0	0	0	0
Proposed Plan – Wells Drilled	-228	-44	-165	-19
Proposed Plan – Wells Completed	-167	-35	-126	-6

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information

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~~Table W.4~~
~~Oil and Gas Well Numbers in New Leases in GRSG Habitat, 15-Year Period~~

~~Item~~	~~Primary Study Area~~
~~Federal Surface~~	
~~Alternative A – Wells Drilled~~	~~268~~
~~Alternative A – Wells Completed~~	~~207~~
~~Alternative B – Wells Drilled~~	~~157~~
~~Alternative B – Wells Completed~~	~~125~~
~~Alternative C – Wells Drilled~~	~~0~~
~~Alternative C – Wells Completed~~	~~0~~
~~Alternative D – Wells Drilled~~	~~204~~
~~Alternative D – Wells Completed~~	~~156~~
~~Alternative E – Wells Drilled~~	~~268~~
~~Alternative E – Wells Completed~~	~~207~~
~~Federal, State, and Fee Surface~~	
~~Alternative A – Wells Drilled~~	~~356~~
~~Alternative A – Wells Completed~~	~~276~~
~~Alternative B – Wells Drilled~~	~~216~~
~~Alternative B – Wells Completed~~	~~173~~
~~Alternative C – Wells Drilled~~	~~0~~
~~Alternative C – Wells Completed~~	~~0~~
~~Alternative D – Wells Drilled~~	~~271~~
~~Alternative D – Wells Completed~~	~~207~~
~~Alternative E – Wells Drilled~~	~~356~~
~~Alternative E – Wells Completed~~	~~276~~

~~Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information~~

The production per ~~new~~ well was assumed based on the typical production of existing wells in the area, or 1,471 MMCF per gas well and 200 MBO per oil well over a 20 year well life. Each well was assumed to have a 20-year life and 75 percent of its lifetime production would be reached during the 15-year period. ~~Total oil and gas production under Alternative A was based on multiplying production per well and the number of wells drilled and completed (estimated as described above).~~ The production that would be affected by each alternative is proportional to the share of wells affected by GRSG habitat, as appropriate for each alternative. Reductions in drilled and completed wells relative to Alternative A correspond to approximately 7 percent under alternative D and the Proposed Plan, 10 percent under Alternative B and 27 percent under Alternative C, with no reduction under Alternative E. **Table W.5**, Projected Oil and Gas Production, 15-Year Period, presents the projected quantity of oil and gas over the 15-year forecast period on federal surface and on federal, state, and fee surface.

Table W. 5

Projected Oil (MBO) and Gas (MMCF) Production in New and Existing Leases, Relative to Alternative A, 15-Year period

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Item	***Federal, State, and Fee Surface***	***Federal Surface***	***State and Fee Surface***
Alternative B – Gas (MMCF)	-113,083	-101,628	-11,455
Alternative B – Oil (MBO)	-2,775	-2,580	-195
Alternative C – Gas (MMCF)	-302,842	-277,417	-25,425
Alternative C – Oil (MBO)	-9,075	-8,366	-709
Alternative D – Gas (MMCF)	-77,228	-72,791	-4,436
Alternative D – Oil (MBO)	-1,950	-1,909	-41
Alternative E – Gas (MMCF)	0	0	0
Alternative E – Oil (MBO)	0	0	0
Proposed Plan – Gas (MMCF)	-78,882	-75,183	-3,699
Proposed Plan – Oil (MBO)	-1,800	-1,827	27

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information.
MMCF = million cubic feet; MBO = thousand barrels

The costs of drilling and completing wells and producing oil and gas also are relevant for the economic impact analysis. Cost of completion or drilling per well were assumed to sum to $3,250,000 for vertical wells under Alternatives A, and E, wells not on federal lands, and wells on federal lands not in priority sage grouse habitat. This is ~~,~~a mid-point in the $1,500,000 to $5,000,000 range typical for the region (BLM 2013a). Directional wells were assumed to be approximately 5 percent more expensive to driil per foot and similarly costly to complete, and horizontal wells were assumed to be 30 percent more expensive to drill per foot and similarly costly to complete. Vertical wells were assumed to be 43 percent of total wells, directional wells were assumed to be 55 percent of total wells and horixontal wells were assumed to be 2 percent of total wells.

For alternatives B, C, D and the Proposed Plan, wells drilled in priority habitat on federal lands were assumed to have increased costs. These increased costs would affect both wells on existing leases and new wells. The increased costs would be a consequence of increased directional drilling, from 55 percent of total wells to 75 percent of total wells, and horizontal drilling, from 2 percent of total wells to 5 percent of total wells. In addition, increased costs would derive from required design features identified in Appendix J and off-location mitigation requirements. In Alternatives A and E, the average cost of drilling and completing a well was estimated to be $3,371,400. In Alternatives B, C, D and the proposed plan, the average cost for drilling and completing a well was estimated to be $4, 498,000. This increase in costs translates in increases local expenditures per well and, therefore, increased outcome, employment and earnings impacts per well.

The increased costs of drilling in priority habitat was assumed to impact the number of wells drilled under ~~–~~existing leases in Alternatives B, C, D and the Proposed Plan[1]. Because the reduction in the number of wells drilled in existing leases was assumed to be proportional to the increase in drilling costs under Alternatives B, C, D and the Proposed Plan. These reductions are already reflected in the number of wells drilled and completed under each alternative, relative to Alternative A, shown in **Table W.4**.

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IMPLAN was used to generate output, employment, and earnings multipliers per million dollars of expenditures. These multipliers were then applied to the estimated expenditures with drilling and completion by alternative to obtain the resulting impacts.A summary of the costs of drilling and completion and impacts per well used for the economic analysis is shown in ~~.–~~**Table W.6**, Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Alternatives A and E, and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan, and ~~provides a summary of the costs of drilling and completion used for the economic analysis.~~ **Table W.7**, Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan. Assumptions are shown for the Primary Study Area, the Primary and Secondary Study Area and for a Three County Area consisting of Duchesne, Carbon and Uintah counties. As explained in Chapter 4.22 Social and Economic Impacts (Including Environmental Justice), these three counties are expected to bear a considerable share of the economic impacts associated with the effects of management alternatives on oil and gas development. The analysis of the three county area assumed all parameters would be the same as those used for the broader analysis of the impacts on the primary and secondary areas (e.g. sectors affected by oil and gas related expenditures, labor productivity, etc.) except that all direct expenditures previously assumed to occur in the primary study area would now only occur in the three county area.

~~**Alternative A**~~		~~**Alternative B**~~		~~**Alternative C**~~		~~**Alternative D**~~		~~**Alternative E**~~	
~~**Gas**~~	~~**Oil**~~	~~**Gas**~~	~~**Oil**~~	~~**Gas**~~	~~**Oil**~~	~~**Gas**~~	~~**Oil**~~	~~**Gas**~~	~~**Oil**~~
~~***Federal Surface***~~									
~~189,759~~	~~5,250~~	~~111,428~~	~~3,600~~	~~0~~	~~0~~	~~143,422~~	~~3,900~~	~~189,759~~	~~5,250~~

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[1] Alternatives B, C, D and the proposed plan were assumed to require increased costs of drilling equally, relative to Alternative A.

~~***Federal, State, and Fee Surface***~~									
~~234,992~~	~~9,450~~	~~134,597~~	~~7,650~~	~~0~~	~~0~~	~~177,623~~	~~6,900~~	~~234,992~~	~~9,450~~

~~Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information (BLM 2013a).~~
~~MMCF = million cubic feet; MBO = thousand barrels~~

Table W.6
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Alternatives A and E and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area
Drilling Impacts			
Total Drilling Costs[1]	$1,640,290 ~~$1,581,225~~	$1,640,290 ~~$1,581,225~~	$1,640,290
Total Local Drilling Costs[2]	$1,439,222 ~~$1,387,397~~	$1,439,222 ~~$1,387,397~~	$1,439,222
Local Direct Impact ($/well)	$1,439,222 ~~$1,387,397~~	$1,439,222 ~~$1,387,397~~	$1,439,222
Local Indirect Impact ($/well)	$299,375 ~~$288,595~~	$479,317 ~~$462,057~~	$236,831
Local Induced Impact ($/well)	$320,223 ~~$308,692~~	$434,455 ~~$418,811~~	$286,130
Local Total Impact ($/well)[3]	$2,058,819 ~~$1,984,684~~	$2,352,993 ~~$2,268,265~~	$1,962,183
Multiplier (total impact/direct impact)	1.43	1.63	1.36
Completion Impacts			
Total Completion Costs[1]	$1,731,110 ~~$1,668,775~~	$1,731,110 ~~$1,668,775~~	$1,731,110
Total Local Completion Costs[2]	$1,052,633 ~~$1,014,729~~	$1,052,633 ~~$1,014,729~~	$1,052,633
Local Direct Impact ($/well)	$1,052,633 ~~$1,014,729~~	$1,052,633 ~~$1,014,729~~	$1,052,633
Local Indirect Impact ($/well)	$253,164 ~~$244,048~~	$390,856 ~~$376,782~~	$195,471
Local Induced Impact ($/well)	$240,337 ~~$231,683~~	$325,751 ~~$314,021~~	$210,663
Local Total Impact ($/well)[3]	$1,546,134 ~~$1,490,460~~	$1,769,240 ~~$1,075,532~~	$1,458,766
Multiplier (total impact/direct impact)	1.47	1.68	1.39

Source: Drilling and completion costs (the first row in each part of the table) were based on the mid-point of a range provided by BLM staff (BLM 2013a), $3,250,000 per well for vertical wells. Costs for directional and horizontal wells were adjusted, as explained in the text. Remaining data is from IMPLAN, as described in the text.

[1] C~~onventional wells. In the case of coalbed natural gas wells, a drilling cost of $503,431 (local cost of $420,075) was assumed. Completion costs for coalbed natural gas wells were assumed to be $996,569 (local cost of $542,101). C~~oalbed natural gas wells were assumed to be included in the estimate of the average cost of vertical wells. Coalbed natural gas well costs would correspond to the lower end of the

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Table W.6
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Alternatives A and E and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area

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range provided by BLM (2013)~~, based on the notion that coalbed natural gas wells are typically cheaper than conventional wells~~.

[2]The local cost shares correspond to the percent of total drilling or completion costs that would be spent on goods and services purchased from the local economy and were assumed based on regional experience.

[3]Total impacts estimated using IMPLAN include direct, indirect, and induced impacts.

Table W.7
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area
	Drilling Impacts		
Total Drilling Costs[1]	$2,188,416	$2,188,416	$2,188,416
Total Local Drilling Costs[2]	$1,920,157	$1,920,157	$1,920,157
Local Direct Impact ($/well)	$1,920,157	$1,920,157	$1,920,157
Local Indirect Impact ($/well)	$399,415	$639,487	$315,971
Local Induced Impact ($/well)	$427,230	$579,634	$381,745
Local Total Impact ($/well)[3]	$2,746,803	$3,139,279	$2,617,873
Multiplier (total impact/direct impact)	1.43	1.63	1.36
	Completion Impacts		
Total Completion Costs[1]	$2,309,584	$2,309,584	$2,309,584
Total Local Completion Costs[2]	$1,404,385	$1,404,385	$1,404,385
Local Direct Impact ($/well)	$1,404,385	$1,404,385	$1,404,385
Local Indirect Impact ($/well)	$337,762	$521,466	$260,790
Local Induced Impact ($/well)	$320,649	$434,605	$281,059
Local Total Impact ($/well)[3]	$2,062,797	$2,360,456	$1,946,233
Multiplier (total impact/direct impact)	1.47	1.68	1.39

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Source: Drilling and completion costs (the first row in each part of the table) were based on the mid-point of a range provided by BLM staff (BLM 2013a), $3,250,000 per well for vertical wells. Costs for directional and horizontal wells were adjusted, as explained in the text. Remaining data is from IMPLAN, as described in the text.

[1]Coalbed natural gas wells were assumed to be included in the estimate of the average cost of vertical wells. Coalbed natural gas well costs would correspond to the lower end of the range provided by BLM (2013).

[2]The local cost shares correspond to the percent of total drilling or completion costs that would be spent on goods and services purchased from the local economy and were assumed based on regional

Table W.7
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area

experience.

[3] Total impacts estimated using IMPLAN include direct, indirect, and induced impacts.

Table W.8~~7~~, Assumptions for Analysis of Economic Impacts on Output for Oil and Gas Production, provides the assumptions used to determine the economic impact associated with the production of oil and gas. For the analysis, the BLM estimated a nonlabor production cost (for gas) of $4.23 per thousand cubic feet and $82.53 per barrel of oil, in year 2011 dollars, based on data from the Energy Information Administration for the Rocky Mountain Region (Energy Information Administration 2013).

The forecasted number of wells and production used for estimating employment impacts is the same as for estimating impacts on labor earnings and output. The direct and total employment impacts attributable to drilling and completion are shown in **Table W.~~8~~9**, Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, ~~shows the direct and total employment impacts attributable to drilling and completion.~~Alternatives A and E, and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan, and **Table W.10**, Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan

Table W.11~~9~~, Assumptions for Employment Impact Analysis for Oil and Gas Production, shows the direct and total employment impacts associated with production.

Table W.8~~7~~
Assumptions for Analysis of Economic Impacts on Output for Oil and Gas Production

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area
Oil Production (per thousand barrels)			
Direct Economic Impact[1]	$82,530[2]	$82,530~~[3]~~	$82,530
Indirect Economic Impact[4]	$8,309	$12,123	$5,760
Induced Economic Impact[5]	$2,924	$4,573	$2,190
Total Economic Impact	$93,763	$99,226	$90,480
Multiplier (total impact/direct impact)	1.14	1.20	1.10
Gas Production (per million cubic feet)			
Direct Economic Impact[1]	$4,230~~.00~~[3]	$4,230~~.00~~	$4,230
Indirect Economic Impact[4]	$425~~.87~~	$621~~.35~~	$295

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Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area
Induced Economic Impact[5]	$149~~.89~~	$234~~.40~~	$112
Total Economic Impact	$4,805~~.75~~	$5.085~~.75~~	$4,637
Multiplier (total impact/direct impact)	1.14	1.20	1.10

Note: All dollar values are in year 2011 dollars.

[1] Direct economic impact is the market value of output.

[2] Based on an oil price of $82.53 per barrel, which is the 2011 Utah Crude Oil First Purchase Price reported by the US Energy Information Administration (EIA 2013).

[3] Based on a gas price of $4,23 per thousand cubic feet, which is the 2010 Utah Natural Gas Wellhead Price reported by the US Energy Information Administration (EIA 2013).

[4] Indirect impacts from IMPLAN reflect increased demand in sectors that directly or indirectly provide supplies to the oil and gas industry.

[5] Induced impacts from IMPLAN reflect increased demand in the consumer sectors.

Table W.~~8~~9

Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, Alternatives A and E, and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan~~[1]~~

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area
	Drilling Impacts		
Direct Employment (jobs/well)	8.3~~8.0~~	8.3~~8.0~~	8.2
Indirect Employment (jobs/well)	2.6~~2.5~~	3.5~~3.4~~	1.9
Induced Employment (jobs/well)	3.1~~3.0~~	3.9~~3.8~~	2.7
Total Employment Impact (jobs/well)	14.0~~13.5~~	15.8~~15.2~~	12.8
Multiplier (Total Impact/Direct Impact)	1.69	1.90	1.56
Average Earnings per Job (2011 dollars)	$51,377	$51,337	$56,543
	Completion Impacts		
Direct Employment (jobs/well)	6.5~~6.3~~	6.5~~6.3~~	6.5
Indirect Employment (jobs/well)	2.2~~2.1~~	2.9~~2.8~~	1.6
Induced Employment (jobs/well)	2.3~~2.2~~	2.9~~2.8~~	2.0
Total Employment Impact (jobs/well)	11.0~~10.6~~	12.3~~11.9~~	10.1
Multiplier (Total Impact/Direct Impact)	1.68	1.89	1.54
Average Earnings per Job (2011 dollars)	$49,031	$49,108	$52,704

Note: Direct and total employment impact and average earnings per job are calculated using IMPLAN.

~~[1] Conventional wells. Multipliers for coalbed natural gas wells are considerably smaller: 4.3 total jobs per well drilled in the primary study area and 5.3 jobs per well completed.~~

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Table W.10
Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, D and Proposed Plan

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Three County Area
Drilling Impacts			
Direct Employment (jobs/well)	11.1	11.1	10.9
Indirect Employment (jobs/well)	3.5	4.7	2.5
Induced Employment (jobs/well)	4.2	5.3	3.6
Total Employment Impact (jobs/well)	18.7	21.0	17.0
Multiplier (Total Impact/Direct Impact)	1.69	1.90	1.56
Average Earnings per Job (2011 dollars)	$51,377	$51,337	$56,543
Completion Impacts			
Direct Employment (jobs/well)	8.7	8.7	8.7
Indirect Employment (jobs/well)	2.9	3.9	2.1
Induced Employment (jobs/well)	3.0	3.9	2.6
Total Employment Impact (jobs/well)	14.7	16.5	13.4
Multiplier (Total Impact/Direct Impact)	1.68	1.89	1.54
Average Earnings per Job (2011 dollars)	$49,031	$49,108	$52,704

Note: Direct and total employment impact and average earnings per job are calculated using IMPLAN.

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Table W.11~~9~~
Assumptions for Employment Impact Analysis for Oil and Gas Production

Employment Impact (annual number of jobs per thousand barrels or million cubic feet)	Primary Study Area	Primary and Secondary Study Area	Three County Area
Oil Production (per thousand barrels)			
Direct Employment	0.028968	0.028968	0.029051
Indirect Employment	0.067014	0.087647	0.036808
Induced Employment	0.027978	0.040935	0.020302
Total Employment	0.123960	0.157550	0.086161
Multiplier (Total Impact/Direct Impact)	4.28	5.44	2.97
Average Earnings per Job (2011 dollars)	$52,485	$52,242	$63,800
Gas Production (per million cubic feet)			
Direct Employment	0.001485	0.001485	0.001489
Indirect Employment	0.003435	0.004492	0.001887
Induced Employment	0.001434	0.002098	0.001041

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Employment Impact (annual number of jobs per thousand barrels or million cubic feet)	Primary Study Area	Primary and Secondary Study Area	Three County Area
Total Employment	0.006353	0.008075	0.004416
Multiplier (Total Impact/Direct Impact)	4.28	5.44	2.97
Average Earnings per Job (2011 dollars)	$52,485	$52,242	$63,800

Note: Direct, indirect, and induced employment impact and average earnings per job are calculated using IMPLAN.

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The analysis of potential changes in tax revenues is based on tax rates of 12.5 percent of taxable value for federal mineral royalties and 5 percent of taxable value for state severance taxes: Utah severance tax rates are 5 percent for value above a minimum, so 5 percent is an upper bound (University of Utah 2010). Taxable value was assumed to be 87.5 percent of value of sales based on a report for neighboring Colorado.[1] **Table W.12~~0~~**, Tax Collections from Oil and Gas Production, Annual Average, 2011 $ shows tax collections for the annual average production under each alternative in the primary study area.

The IMPLAN sectors used to model an exogenous change in demand for oil and gas well drilling were the following (IMPLAN sector numbers are shown in brackets): drilling oil and gas wells (28), support activities for oil and gas operations (29), construction of new manufacturing structures (35), constructure of other new structures (36), wholesale trade (319), truck transportation (335), telecommunications (351), commercial and industrial equipment leasing (365), architectural and engineering services (369). In the gas of oil and gas production, the sector used was oil and gas extraction (20).

COAL

The economic impact of coal production is estimated based on the volume of coal produced and the sales price of coal. BLM projected coal production in the State of Utah to 2028 based on information from the US Energy Information Administration (EIA) and the Utah Geological Survey (BLM 2013; Utah Geological Survey 2010). These projections incorporate expected future trends of related prices and quantities (e.g. the price of gas). Although these projections include coal from San Juan County, which is not part of the Study Area for this EIS, the coal from San Juan would not be affected by the choice of alternatives and therefore does not affect the comparison of alternatives. For the estimation of the impacts of the alternatives on coal production, the following assumptions were made, based on information in various documents:

- 77 percent of all production is from federal mineral lands (BLM 2013b)~~lands~~
- New coal leases would be required for underground coal production from 2017 onwards

---

[1] This was based on information available for the State of Colorado from the Colorado Oil and Gas Association (Colorado Oil and Gas Association 2011). Valuation for Utah may be slightly above or below this number.

- BLM made the assumption for analysis purposes only that no new subsurface leasing would occur in priority habitat (for Alternative B) or occupied habitat (for Alternative C). The idea that closing GRSG habitat to new leases would effectively preclude underground coal mining represents a worst-case scenario because nothing in this alternative would preclude leasing of subsurface materials.
- The Alton coal field would generate 1,840,000 tons of coal per year starting in 2016 from surface coal mining, under Alternatives A, D and E (BLM 2011). For analytical purposes only, this coal is assumed to be produced entirely from federal lands. BLM assumed that no production would occur from the Alton coal field in Alternatives B and C, based on it being a surface mine. To the extent that some underground mining of the deposit could still occur, accessed through surrounding non-Federal lands, this assumption of no production under alternatives B and C may overstate the actual impacts of those alternatives.

Table W.12~~0~~
Tax Collections from Oil (MBO) and Gas (MMCF) Production Relative to Alternative A, 15 Year Period, 2011 $

	Alternative B~~A~~		Alternative C~~B~~		Alternative D~~C~~		Alternative E~~D~~		Proposed Plan~~Alternative E~~	
	Gas	Oil	Gas	Gas	Gas	Oil	Gas	Oil	Gas	Oil
Total production	-113,083~~189,759~~	-2,775~~5,250~~	302,842~~$111,428.25~~	-9,075~~$3,600~~	-77,227~~0~~	-1,950~~0~~	0~~143,423~~	0~~3,900~~	-77,227~~189,759~~	-1,950~~5,250~~
Prices	$4,230~~$4,230~~	$82,530~~$82,530~~	$4,230~~$4,230~~	$82,530~~$82,530~~	$4,230~~$4,230~~	$82,530~~$82,530~~	$4,230 ~~$4,230~~	$82,530 ~~$82,530~~	$4,230~~$4,230~~	$82,530~~$82,530~~
Assessed valuation	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~	87.5%~~87.5%~~
Assessed value	$418,548,454~~$702,345,499~~	$200,393,156~~$379,122,188~~	$1,120,893,953 ~~$412,423,810~~	$655,339,781~~$259,969,500~~	$285,836,434~~$0~~	$140,816,813 ~~$0~~	$0~~$530,842,528~~	$0~~$281,633,625~~	$285,836,434~~$702,345,499~~	$140,816,813 ~~$379,122,188~~
Federal royalties rate	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~	12.5%~~12.5%~~
Federal royalty tax	$47,018,829~~$87,793,187~~	$23,288,934~~$47,390,273~~	$128,348,709~~$51,552,976~~	$75,526,556~~$32,496,188~~	-$33,677,211~~$0~~	$17,241,033~~$0~~	$0~~$66,355,316~~	$0~~$35,204,203~~	$34,783,885~~$87,793,187~~	$16,491,815~~$47,390,273~~
State severance rate	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~	5.0%~~5.0%~~
State severance tax	$20,927,423~~$35,117,275~~	$10,019,658~~$18,956,109~~	$56,044,698~~$20,621,191~~	$32,766,989~~$12,998,475~~	-$14,291,822~~$0~~	-$7,040,841~~$0~~	$0~~$26,542,126~~	$0~~$14,081,681~~	$14,291,822~~$35,117,275~~	$7,040,841~~$18,956,109~~
Total taxes	$67,946,252~~$122,910,462~~	$33,308,592~~$66,346,383~~	$184,393,407~~$72,174,167~~	$108,293,545~~$45,494,663~~	-$47,969,033~~$0~~	$24,281,873~~$0~~	$0~~$92,897,442~~	$0~~$49,285,884~~	$49,075,707~~$122,910,462~~	$23,532,656~~$66,346,383~~

Source: Production volumes elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information. Prices are from Energy Information Administration (2013). Assessed valuation percentage is based on information available for Colorado (Colorado Oil and Gas Association 2011).
MMCF = million cubic feet; MBO = thousand barrels

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The estimated annual average volume of coal produced on federal lands under each alternative is presented in **Table W.11** below.

Table W.11
Estimated Annual Average Coal Production on Federal Lands in Utah (tons), 2014-2028

	Underground	Surface	Total
Alternative A	15,291,616	1,594,667	16,886,283
Alternative B	13,150,790	0	13,150,790
Alternative C	12,080,377	0	12,080,377
Alternative D	15,291,616	1,594,667	16,886,283
Alternative E	15,291,616	1,594,667	16,886,283

Source: BLM 2013b

Estimates of the impacts of coal production were developed using IMPLAN and assuming a price for underground coal of $33.80 per ton, which is the EIA's 2011 coal price estimate for Utah (EIA 2013), and a price of $23.86 per ton for surface coal. The price for surface coal is estimated as the average between the price for underground coal for Utah and the price of surface mining in Wyoming's Powder River Basin (used as a reference). The basis for this is the fact that the Alton mine coal is expected to have 10,000 BTU per pound (BLM 2011). Surface coal mined from the Powder River Basin in Wyoming contains about 8,800 BTU per pound and has an average price of $13.56 per ton. The EIA estimates the price of underground coal in Utah to be $33.80 per ton based on 11,700 BTU per pound of coal. The simple average in prices would approximate the expected BTU for the coal from the Alton mine.

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Table W.12 and **Table W.13** show the multipliers for output and employment, respectively, estimated for coal. Assumptions are showns for the Primary Study Area, the Primary and Secondary Study Area and for an Eight County Area consisting of Carbon, Emery, Sanpete, and Kane, as well as counties that could be expected to provide construction inputs, materials, transportation services and other supplies, and that are located within the primary or secondary study area. These include Sevier, Paiute, Garfield and Millard. Utah County was also considered but was not included, because it would disproportionately impact the results, given its large population and economy relative to the other counties. As explained in Chapter 4.22 Social and Economic Impacts (Including Environmental Justice), these eight counties are expected to bear a considerable share of the economic impacts associated with the effects of management alternatives on coal development and production.

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Table W.12
Assumptions for Analysis of Impacts on Output for Coal

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Eight County Area
	Underground		
Direct Economic Impact ($/MT)	$33,800	$33,800	$33,800
Indirect Economic Impact ($/MT)[1]	$8,147	$15,218	$7,799
Induced Economic Impact ($/MT)[2]	$5,305	$8,258	$4,601

Table W.12
Assumptions for Analysis of Impacts on Output for Coal

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Economic Impact	Primary Study Area	Primary and Secondary Study Area	Eight County Area
Total Economic Impact ($/MT)	$47,251	$57,276	$46,200
Multiplier (Total Impact/Direct Impact)	1.40	1.69	1.37
Surface			
Direct Economic Impact ($/MT)	$23,680	$23,680	$23,680
Indirect Economic Impact ($/MT)[1]	$5,149	$7,886	$3,911
Induced Economic Impact ($/MT)[2]	$3,018	$4,357	$2,494
Total Economic Impact ($/MT)	$31,847	$35,923	$30,085
Multiplier (Total Impact/Direct Impact)	1.34	1.52	1.27

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Source: IMPLAN; Note: All dollar values are in 2011 dollars.

[1] Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the coal industry.

[2] Induced impacts reflect increased demand in the consumer and government sectors.

Table W.13
Assumptions for Analysis of Impacts on Employment for Coal

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Employment Impact	Primary Study Area	Primary and Secondary Study Area	Eight County Area
Underground			
Direct Employment (jobs/MT)	0.089502	0.089502	0.089502
Indirect Employment (jobs/MT)	0.048266	0.079295	0.039952
Induced Employment (jobs/MT)	0.050768	0.073988	0.042250
Total Employment Impact (jobs/MT)	0.188536	0.242785	0.171704
Multiplier (Total Impact/Direct Impact)	2.11	2.71	1.92
Average Earnings per Job (2011 dollars)	$63,113	$61,601	$67,879
Surface			
Direct Employment (jobs/MT)	0.044862	0.044862	0.044862
Indirect Employment (jobs/MT)	0.026481	0.038363	0.025405
Induced Employment (jobs/MT)	0.028898	0.039331	0.022899
Total Employment Impact (jobs/MT)	0.100241	0.122556	0.093166
Multiplier (Total Impact/Direct Impact)	2.23	2.73	2.08
Average Earnings per Job (2011 dollars)	$65,666	$63,715	$69,416

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Source: IMPLAN; Note: All dollar values are in 2011 dollars.

[1] Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the coal industry.

[2] Induced impacts reflect increased demand in the consumer and government sectors.

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The IMPLAN sector used to model an exogenous change in demand for coal was coal mining (21).

Potential changes in tax revenues associated to Federal mineral royalties are estimated based on a 12.5 percent royalty rate for surface coal and 8 percent royalty rate for underground coal (BLM). The value of coal output under each alternative was estimated as discussed above. **Table W.14**, Estimated Coal Royalties in Primary Study Area, 15-Year Period shows royalties collections for the estimated production under each alternative.

Table W.14
Estimated Coal Royalties in Primary Study Area, 15-Year Period

	Alternatives A, D and E			Alternative B			Alternative C		
	Underground	**Surface**	**Total**	**Underground**	**Surface**	**Total**	**Underground**	**Surface**	**Total**
Mtons	15,292	1,595	16,886	13,151	0	13,151	12,080	0	12,080
Output (2011 $000)	$516,857	$37,762	$554,619	$444,497	$0	$444,497	$408,317	$0	$408,317
Royalties (%)	8.0%	12.5%		8.0%	12.5%		8.0%	12.5%	
Royalties (2011 $000)	$41,349	$4,720	$46,069	$35,560	$0	$35,560	$32,665	$0	$32,665

WIND ENERGY

The economic impact of wind energy depends on the expenditures made with installation and operations of wind farms. Expenditures made in the Primary Study Area were estimated based on the amount of electricity (nameplate capacity in megawatts, MW[1]) ~~MW)~~ projected under each alternative, and the installation and operations costs per MW.

BLM projected 17,328 acres of reasonably foreseeable wind development in the Hamlin and Bald Hills Sage-Grouse population areas, under Alternative A. Using Utah's Milford Wind Corridor Project as a baseline, BLM estimated that this would correspond to approximately 210 MW of installed capacity. The same installed capacity would be projected under Alternative E. Based on GIS analysis, 121 MW would be potentially installed under Alternatives B, C and D.

Installation and operations costs per MW were obtained from default values for the State of Utah used by the Jobs and Economic Development Impact (JEDI) model. The JEDI model for wind energy was developed by the National Renewable Energy Laboratory and default values for construction and operation costs per MW were determined based on extensive interviews with power generation project developers, state tax representatives, and others in the appropriate industries (NREL 2012). Default values were based on projects of 100 MW (50 turbines of 2,000 kilowatts each) and were estimated to be, in 2008 dollars,~~2008 dollars~~, $2,000 per kilowatt for installed project costs and $20 per kilowatt for operations and maintenance costs.~~costs~~.

Tables W.15 and W.16 below show the estimated multipliers for output and employment during installation and operations. Assumptions are showns for the Primary Study Area, the Primary and Secondary Study Area and for a Two County Area consisting of Millard and Beaver counties. As explained in Chapter 4.22 Social and Economic Impacts (Including Environmental Justice), these two counties are expected to bear a considerable share of the economic impacts associated with the effects of management alternatives on wind energy development and production.

Table W.15
Assumptions for Analysis of Impacts on Output for Wind Energy

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Two County Area
Installation			
Direct Economic Impact ($/MW)	$303,774	$303,774	$303,774
Indirect Economic Impact ($/MW)[1]	$53,862	$94,884	$30,900
Induced Economic Impact ($/MW)[2]	$46,892	$67,484	$33,776
Total Economic Impact ($/MW)	$404,527	$466,142	$368,450
Multiplier (Total Impact/Direct Impact)	1.33	1.53	1.21
Operations			
Direct Economic Impact ($/MW)	$17,176	$17,176	$17,176
Indirect Economic Impact ($/MW)[1]	$572	$845	$384
Induced Economic Impact ($/MW)[2]	$5,390	$6,664	$3,883

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[1] Megawatt = one thousand kilowatts

Table W.15
Assumptions for Analysis of Impacts on Output for Wind Energy

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Two County Area
Total Economic Impact ($/MW)	$23,138	$24,685	$21,442
Multiplier (Total Impact/Direct Impact)	1.35	1.44	1.25

Source: IMPLAN. Note: All dollar values are in 2011 dollars.

[1] Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the installation and operations of wind farms.

[2] Induced impacts reflect increased demand in the consumer and government sectors.

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Table W.16
Assumptions for Analysis of Impacts on Employment for Wind Energy

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Two County Area
Installation			
Direct Employment (jobs/MW)	1.77	1.77	1.77
Indirect Employment (jobs/MW)	0.37	0.57	0.22
Induced Employment (jobs/MW)	0.45	0.61	0.31
Total Employment Impact (jobs/MW)	2.58	2.94	2.30
Multiplier (Total Impact/Direct Impact)	1.46	1.67	1.30
Average Earnings per Job (2011 dollars)	$40,834	$42,141	$40,177
Operations			
Direct Employment (jobs/MW)	0.24	0.24	0.24
Indirect Employment (jobs/MW)	0.01	0.01	0.00[3]
Induced Employment (jobs/MW)	0.05	0.06	0.04
Total Employment Impact (jobs/MW)	0.29	0.30	0.28
Multiplier (Total Impact/Direct Impact)	1.24	1.28	1.17
Average Earnings per Job (2011 dollars)	$41,985	$42,157	$42,037

Source: IMPLAN. Note: All dollar values are in 2011 dollars.

[1] Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the installation and operations of wind farms.

[2] Induced impacts reflect increased demand in the consumer and government sectors.

[3] 0.004

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The IMPLAN sectors used to model an exogenous change in demand for wind energy development were the following (IMPLAN sector numbers are shown in brackets): sand and gravel mining (26), ready-mix concrete manufacturing (161), wholesale trade (319), retail-building materials and garden supply (323), hotels and motels (411), food services and drinking places (413), labor income change (NA). In the case of wind energy operations, the IMPLAN sectors used were the following: electrical power (31), nonresidential maintenance and power (39), wholesale trade (319), retail – motor vehicle and parts (320), retail – building materials and garden supply (323), retail – gasoline stations (326), other state and local government enterprises (432), labor income change (NA), state and local government – non-educational (NA), state and local government – educational (NA). Unlike other sectors modeled in IMPLAN for this EIS, the state and local government sector was included when modeling wind energy operations following the NREL JEDI model on which the model for this EIS was based.

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From: Sidon, Joshua [jsidon@blm.gov]
Sent: Wednesday, April 17, 2013 6:22 AM
To: Fetter, Rob; Uriarte, Alex
CC: ICF_SGSE; Miller, Chris J -FS
Subject: Fwd: Sage Grouse Weekly Subregional NEPA Project Managers Meeting - Weds 4/17/13 - Agenda
Attachments: GRSG_Master Program Schedule_2013-04-03.xlsx; GRSG EIS Amendment tracking_2013-04-03.xlsx

Weekly schedules attached.

---------- Forwarded message ----------
From: **David Batts** <david.batts@empsi.com>
Date: Tue, Apr 16, 2013 at 9:40 AM
Subject: Sage Grouse Weekly Subregional NEPA Project Managers Meeting - Weds 4/17/13 - Agenda
To: Meredith Zaccherio <meredith.zaccherio@empsi.com>, Chad Ricklefs <chad.ricklefs@empsi.com>, Holly Prohaska <holly.prohaska@empsi.com>, akosic@blm.gov, ssovey@blm.gov, qfbahr@blm.gov, lmermejo@blm.gov, t1thomps@blm.gov, gfrederick@blm.gov, bralston@blm.gov, Derek Holmgren <derek.holmgren@empsi.com>, Marcia Rickey <marcia.rickey@empsi.com>, "Stein, Glen" <gstein@fs.fed.us>, sharphay@att.net, jmunson@blm.gov, rmickelsen@fs.fed.us, maadams@blm.gov, jsellarb@blm.gov, sservoss@blm.gov, rrodriguez01@fs.fed.us, Sarah.Shattuck@sol.doi.gov, erjones@blm.gov, jthompso@blm.gov, kprill@blm.gov, fquamen@blm.gov, jcagney@blm.gov, lsolberg@blm.gov, tbills@blm.gov, "Bode, Pam -FS" <pbode@fs.fed.us>, chiner@blm.gov, kyannone@blm.gov, rsell@blm.gov, "Moody, Aaron" <Aaron.Moody@sol.doi.gov>, dwood@blm.gov, jtwood@blm.gov, "Miller, Ruth A" <ramiller@blm.gov>, jccarlso@blm.gov, ddippon@blm.gov, jsidon@blm.gov, Angie Adams <angie.adams@empsi.com>, jsuther@blm.gov, mmmartin@fs.fed.us, kpeacock@blm.gov, mmagalet@blm.gov, acarr@blm.gov, tashcrof@blm.gov, jarubado@blm.gov, bclayton@blm.gov, LPidot@blm.gov, dbrunkho@blm.gov, vherren@blm.gov, jbeck@blm.gov, Drew Vankat <drew.vankat@empsi.com>, Peter Gower <peter.gower@empsi.com>, mlanglasward@blm.gov, jtague@blm.gov, David Batts <david.batts@empsi.com>
Cc: kkralick@fs.fed.us, pheavysege@fs.fed.us, sharphay@att.net, pbartschi@fs.fed.us, rskorkowsky@fs.fed.us, chrismiller@fs.fed.us, cmorris01@fs.fed.us, cnorman@fs.fed.us, ccolt@fs.fed.us, dreis@fs.fed.us, tblove@fs.fed.us, dbambrough@fs.fed.us, petermcdonald@fs.fed.us, cmccarthy01@fs.fed.us, katie.patterson@empsi.com

Reminder: GBR/RMR Sage Grouse Weekly Subregional NEPA Project Managers Weekly Conference Call

Wednesday; 9AM PT / 10AM MT

[redacted]

Tentative agenda:

1. ePlanning update / SharePoint Issues – Jamie/Jim
   - Reminder for PMs to work with NOC on dates for incorporating chapters/appendices into ePlanning
   - Gale Saltus, SharePoint contact – 303-236-5258 or gsaltus@blm.gov
2. National, State Director, and SOL updates – Jessica/Matthew/Sarah
3. Regional Updates – Lauren and Johanna
   - North Dakota IDT Briefing – comments from IDT
4. BER, Consistency Framework, and Cumulative Effects Analysis update – David/Vicki/Frank/Drew Vankat
5. Admin Record
   - Need contact info each Great Basin SR AR POC
6. Scheduling and Status – reminder to keep updating schedule and status tracking sheets
7. Chapters 3 and 4
   - Standard text for Lands with Wilderness Characteristics (see attachment)
   - Geothermal resources in fluid minerals
   - Reminder that level of analysis should be targeted to scope and issues
   - Indicators and assumptions for key resources (will be provided via separate email)
   - Habitat definitions - PPH/PGH – any other terms being used for the BLM/FS alt?
8. Other items
9. Unresolved action items from last couple of calls:
   - Project leads: let Jim Wood know if you have any needs for inputting into ePlanning that can be done now.
   - Project leads: work with data managers and CEA team representatives to determine what data layers will be provided for the landscape report according

to the Draft Landscape Report Proposed Data Layers handout. Change question marks to yes or no and provide refinements to questions.

- Lauren: work with Tom and Gordon to set up another call clarifying the HAF. Clearly state purpose of the call with meeting invitations.
- Project leads: reminder to keep updating the schedule and the tracking sheet.
- Brent will work with Johanna regarding Idaho/southwest Montana website concerns. Johanna will discuss these with Mitch Snow.
- Lauren will to talk to Sandra regarding the NV/CA Vista contract to determine if the NV/CA contract can be used for other subregions.
- Matt will develop summary of national planning strategy for subregions to include in their Chapter 1 sections.
- Jim Wood and Pam Bode will discuss scheduling USFS ePlanning training.
- Lauren: follow up with Jessica regarding FAA MOU.
- Brent: send DOD email to Matt regarding MOU.
- Lauren: follow up with Joan regarding Vista.
- Lauren: send John Thompson language regarding 90-day comment period extension.

10. Outstanding Action Items from Reno mtg:

- Lauren and Johanna will provide decision language for use of Required Design Features (BMPs) for the alternatives.

- Matt Magalletti to follow up regarding USFS control over leasing and whether they determine lands open/closed to leasing in their land use plans

David Batts

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Draft - Greater Sage Grouse Plan Amendments and EIS Schedules

updated: February 26, 2013

	Duration	Idaho/Montana		Nevada/California		Oregon		Utah		Lewistown		North Dakota		Colorado	
		Start	*End*	*Start*	*End*	*Start*	*End*	*Start*	*End*	*Start*	*End*	*Start*	*End*	*Start*	*End*
Chapter 1 - Purpose and Need															
Finalize Chapter 1 for inclusion in the DEIS		10/1/2012	3/30/2013	9/28/2012	3/30/2013	9/28/2012	4/5/2013	4/13/2012	5/24/2012	10/2/2012	12/4/2012	10/2/2012	12/4/2012	4/23/2012	3/20/2013
Chapter 2 - Alternatives															
Final Alternative Matrix		8/1/2012	3/8/2013	7/2/2012	4/8/2013	1/28/2013	4/5/2013	4/9/2012	9/13/2012	5/7/2012	9/4/2012	5/7/2012	9/4/2012	4/20/2012	11/1/2012
Subregional Leadership (local/SO) briefing		11/30/2012	12/5/2012	3/22/2013	4/12/2013	1/31 & 2/1	1/31 & 2/1	9/14/2012	9/28/2012	9/12/2012	9/21/2012	9/12/2012	9/21/2012	9/12/2012	9/21/2012
Regional Management Team briefing *(range of alternatives)*		12/1/2012	12/15/2012	4/8/2013	4/8/2013	12/13/2012	12/13/2012	10/29/2012	11/2/2012	10/9/2012	10/17/2012	10/9/2012	10/17/2012	10/29/2012	11/2/2012
WO/Solicitor review/briefing		ANY?	ANY?	?	?	?	?	11/26/2012	11/30/2012	10/26/2012	11/2/2012	10/26/2012	11/2/2012	?	?
Prepare Chapter 2 for inclusion in the DEIS		3/11/2013	4/1/2013	4/9/2013	4/19/2013	4/15/2013	4/19/2013	12/7/2012	1/25/2013	11/6/2012	11/14/2012	11/6/2012	11/14/2012	2/28/2013	3/20/2013
Chapter 3 - Affected Environment															
Internal BLM/FS Draft Chapter 3		11/5/2012	1/23/2013	10/29/2012	1/30/2013	8/29/2012	3/22/2013			8/17/2012	1/4/2013	8/17/2012	1/4/2013	4/23/2012	7/6/2012
Final Chapter 3 for inclusion in the DEIS		1/23/2013	3/20/2013	1/30/2013	4/15/2013	3/25/2013	4/12/2013	4/1/2013	5/20/2013	1/12/2013	2/1/2013	1/12/2013	2/1/2013	7/6/2012	3/20/2013
Chapter 4 - Impact Analysis															
Internal BLM/FS Draft Chapter 4		1/22/2013	3/12/2013	11/30/2012	5/20/2013	4/15/2013	5/10/2013	1/14/2013	3/29/2013	11/15/2012	1/4/2013	11/15/2012	1/4/2013	10/1/2012	1/9/2013
Final Chapter 4 for inclusion in the DEIS		3/13/2013	3/20/2013	5/20/2013	5/24/2013	5/13/2013	5/24/2013	4/1/2013	5/20/2013	1/12/2013	2/1/2013	1/12/2013	2/1/2013	1/9/2013	3/20/2013
Analysis Comparison Table		3/20/2013	3/27/2013	5/27/2013	5/31/2013	5/27/2013	5/31/2013	4/1/2013	5/20/2013	1/21/2013	1/23/2013	1/21/2013	1/23/2013	1/9/2013	3/20/2013
Socioeconomic analysis	3 weeks	3/27/2013	4/17/2013	5/31/2013	6/21/2013	5/27/2013	6/14/2013							1/9/2013	3/20/2013
Internal Draft EIS															
Compile, format, edit Internal DEIS		4/17/2013	4/30/2013	6/21/2013	7/5/2013	6/17/2013	7/12/2013	3/12/2013	5/20/2013	12/28/2012	3/8/2013	12/28/2013	3/8/2013	2/28/2013	3/20/2013
DEIS State/Local/Coop Agency Review (GRSG4: Step 1)	2 weeks	5/1/2013	5/15/2013	7/8/2013	7/22/2013	7/15/2013	7/26/2013	5/21/2013	6/5/2013	3/11/2013	3/25/2013	3/11/2013	3/25/2013	3/21/2013	4/4/2013
Incorporate Changes; Prepare DEIS for WO Review	4 weeks	5/16/2013	6/13/2013	7/22/2013	8/19/2013	7/29/2013	8/23/2013	6/6/2013	7/15/2013	3/25/2013	4/19/2013	3/25/2013	4/19/2013	4/4/2013	5/2/2013
Prepare and Submit Regional IDT Materials	*1 week*	5/16/2013	5/23/2013	7/22/2013	7/29/2013	7/29/2013	8/2/2013			3/18/2013	3/25/2013	3/15/2013	3/25/2013	4/4/2013	4/11/2013
Regional IDT Briefing (GRSG4: Step 2)	*1/2 day*	5/30/2013	5/30/2013	8/2/2013	8/2/2013	8/9/2013	8/9/2013	6/19/2013	6/19/2013	4/1/2013	4/5/2013	4/1/2013	4/5/2013	4/22/2013	4/25/2013
Regional Mgmt Team Briefing (GRSG4: Step 3)	*1 day*	6/6/2013	6/6/2013	8/2/2013	8/2/2013	8/16/2013	8/16/2013	6/26/2013	6/26/2013	4/11/2013	4/12/2013	4/11/2013	4/12/2013	4/29/2013	5/2/2013
Submit WO Review DEIS	1 week	6/7/2013	6/14/2013	8/12/2013	8/19/2013	8/23/2013	8/23/2013							5/2/2013	5/2/2013
WO/Solicitor Review (GRSG4: Step 4)	2 weeks	6/14/2013	6/28/2013	8/19/2013	9/2/2013	8/26/2013	9/6/2013	7/16/2013	7/29/2013	4/22/2013	5/3/2013	4/22/2013	5/3/2013	5/2/2013	5/16/2013
Incorporate WO Changes / Final DEIS	3 weeks	7/1/2013	7/22/2013	9/3/2013	9/24/2013	9/9/2013	9/27/2013	7/30/2013	8/19/2013	5/3/2013	5/24/2013	5/3/2013	5/24/2013	5/17/2013	6/7/2013
National Policy Team Briefing	3 days later	7/25/2013	7/25/2013	9/27/2013	9/27/2013	10/1/2013	10/1/2013			5/8/2013	5/8/2013	5/8/2013	5/8/2013	6/10/2013	6/10/2013
Public DEIS															
Document into ePlanning / Print Ready	6 weeks	7/26/2013	9/6/2013	9/30/2013	11/11/2013	10/3/2013	11/14/2013	8/1/2013	9/12/2013	5/24/2013	6/14/2013	5/24/2013	6/14/2013	6/10/2013	7/22/2013
Director Briefing	1 day	9/9/2013	9/9/2013	11/13/2013	11/13/2013	11/5/2013	11/15/2013			6/10/2013	6/10/2013	6/10/2013	6/10/2013	7/23/2013	7/23/2013
Print and Distribute DEIS	1 week	9/10/2013	9/17/2013	11/14/2013	11/21/2013	11/18/2013	11/22/2013	9/16/2013	9/27/2013					7/24/2013	7/31/2013
Publish NOA in Federal Register	1 day	9/20/2013	9/20/2013	11/22/2013	11/22/2013	11/25/2013	11/25/2013	10/4/2013	10/4/2013	7/12/2013	7/12/2013	7/12/2013	7/12/2013	8/2/2013	8/2/2013
Public Review Period	90 days			11/22/2013	2/20/2014	11/25/2013	2/23/2014	10/4/2013	1/2/2014	7/12/2013	10/9/2013	7/12/2013	10/9/2013	8/2/2013	10/31/2013
Analysis of public comments				2/21/2014	4/4/2014			1/3/2014	2/20/2014					10/31/2013	11/29/2013
Final EIS				4/7/2014	9/4/2014			2/7/2014	8/5/2014	2/1/2014	2/1/2014	2/1/2014	2/1/2014	11/29/2013	3/7/2014
ROD				9/5/2014	12/31/2014			7/6/2014	12/19/2014	6/27/2014	6/27/2014	6/27/2014	6/24/2014	4/7/2014	8/8/2014

Chapter/Section		
	Idaho/swMT	UT
Notes regarding percent complete: 90% = EMPSi and BLM are finished with ALL content, includi 100% = all content, GIS, tech editing, and formatting is done, and the chapter is ready for instant		
Chapter 1	75%	50%, draft entered in ePlanning
Chapter 2 - text	40%	0%
Chapter 2 - Alternatives matrix	75%	90
Chapter 3	75%	70%, rough drafts completed by EMPSi. First full review by BLM scheduled April 1 - 12, 2013.
Chapter 4 - direct/indirect	50%	20%, in progress by EMPSi. First full review by BLM scheduled April 1 - 12, 2013.
Chapter 4 - cumulative	0%	0%, subregional analysis has not yet begun.
Other Chapters	0%	0%
Executive Summary	0%	0%
Appendices	0%	0%
Front Matter: Cover	0%	0%
Front Matter: Dear Reader letter	0%	0%
Front Matter: Abstract	0%	0%
Front Matter: Master/full TOC	0%	0%
Front Matter: Chapter dividers (if applicable)	0%	0%
Miscellaneous: CD Labels	0%	0%
Miscellaneous: Document Spines	0%	0%

Back Matter: Glossary	0%	0% - see note
Back Matter: Index	0%	0% - see note
Chapter 4 GIS request	95%	80%, BLM completing requests

Status			
OR: As of 3/11/13	Lewistown	North Dakota	CO
ng GIS, and the chapter is ready for tech editing.			
submittal (i.e., deliverable ready).			
50%	95%	100%	100%
60%: Scheduled for BLM review in March, along with alts matrix and Ch 2 appendices	95%	100%	100%
50%	95%	100%	100%
60%	95%	100%	100%
5% based on Bio impacts team work	95%	100%	100%
0%	95%	100%	100%
0%	95%	100%	100%
0%	95%	100%	100%
10%	95%	100%	90%
0%	100%	100%	100%
0%	100%	100%	100%
0%	100%	100%	100%
0%	90%	100%	100%
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25%	95%	100%	100%
0%	90%	100%	100%
0%	100%	100%	N/A

NV/CA	WY - Bighorn RMP (Supplemental Draft RMP/EIS)	WY - Buffalo Draft RMP/EIS	WY - Lander Proposed RMP / FEIS
50%, draft entered in ePlanning	95%	99%	100%
50%	80%	80%	100%
75%	80%	100%	100%
75%	80%	100%	100%
5% based on Bio impacts team work	80%	99%	100%
0%	80%	99%	100%
Ch.5, Held one meeting for socioeconomics	80%	99%	100%
0%	50%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%
0%	80%	99%	100%

25%	80%	99%	100%
0%	80%	99%	100%
0%	95%	99%	100%

WY - 9 Plan Amendment Draft RMP/EIS	Notes
99%	
99%	need info from UT on alts.
75%	
99%	
50%	
25%	ALL: Received template outline for WAFWA Management Zone analysis and Drew was going to draft text for all subregions.
75%	ALL: Have draft acronyms and glossary. Will need to double check each RMPA/EIS for use of acronyms and terms
80%	
50%	
75%	
75%	
75%	
75%	ALL: EMPSi formatting will create
75%	
75%	
75%	

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Friday, June 27, 2014 1:35 PM
To: Uriarte, Alex
CC: ICF_SGSE; Kurz, Elizabeth
Subject: Fwd: Wyoming Sage-grouse oil and gas production
Attachments: O&GProdTablesState.xlsx

Alex -

Here's O&G production data for the 9-plan. Note - they only went out 8 years. Again let me know if you have questions.

Josh

---------- Forwarded message ----------
From: **Pinkham, Richard [USA]** <PINKHAM_RICHARD@bah.com>
Date: Wed, Jun 25, 2014 at 3:58 PM
Subject: Wyoming Sage-grouse oil and gas production
To: "Sidon, Joshua B (jsidon@blm.gov)" <jsidon@blm.gov>
Cc: "Montag, Jessica" <jmontag@blm.gov>, "Klyse, Bryan [USA]" <klyse_bryan@bah.com>, "David T. Taylor (TTaylor@uwyo.edu)" <TTaylor@uwyo.edu>

Hi Josh. Hello Jessica, too.

Josh, in response to your question yesterday, here is the summary data from the economic analysis for oil and gas production. See columns B and C of the annual tab for production volumes. There are no O/G wells in the MBNF, so there's no file for that unit.

Note that these production estimates include co-production, which may not be included in production estimates for the other regions. I believe the contributions of oil from gas wells are very small, but gas from oil wells is substantial.

Also, FYI and convenience, I've copied below the methodology used, from our technical report.

If you have any questions, let us know!

Cheers,

Richard

Information on production of oil and gas was provided by the BLM's RMG and BLM field and district office staff. This information included the number of wells drilled each year by alternative for each field office or planning unit (from the RFD), the percent of wells that were oil versus gas, the percent of wells completed, production decline curves for oil and gas wells, and estimates of cross production from both oil and gas wells. This information was used to develop total oil and gas production estimates by year for each alternative and each field office or planning unit.

The procedure to determine total production was as follows. For each year, the number of wells completed was broken down into oil and gas wells based on the breakdown assumptions per field office and planning unit provided by BLM staff. For each well type, the average first year production rate (volume) from the annual decline curves for each field office and planning unit (as provided by RMG) was then applied to determine the total production from first-year wells. In subsequent years, the appropriate average production rates from the decline curves were applied to the number of second year wells, third year wells, and so on. Total production was then summed across all the well age cohorts for each year within the analysis period. Co-production volume was calculated based on the numbers of wells of each type and the co-production rates from the RMG, and added to the total production volume.

--
Josh Sidon, Ph.D.
Economist, National Operations Center
Bureau of Land Management
Denver Federal Center, Bldg. 50
P.O. 25047
Denver, CO 80225
Phone: 303-236-6343
Fax: 303-236-3508

Oil and Gas Production Economic Impact - State Annual (2013-2020)

Alternative A

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	320,421,160	3,927,409	$1,647,556,500	$1,860,063,410	1,616.2	$118,342,747
2014	495,171,477	6,138,634	$2,551,986,946	$2,883,986,598	2,540.6	$185,840,555
2015	611,052,882	7,633,737	$3,154,184,424	$3,567,792,645	3,183.6	$232,681,676
2016	710,030,510	8,853,083	$3,663,637,186	$4,147,789,700	3,743.7	$273,409,217
2017	803,320,471	9,990,785	$4,142,830,634	$4,694,216,327	4,278.0	$312,117,006
2018	885,333,018	11,020,593	$4,566,615,767	$5,178,841,633	4,766.1	$347,330,200
2019	965,754,773	12,041,475	$4,983,119,939	$5,655,634,723	5,251.9	$382,317,320
2020	1,038,000,236	12,998,370	$5,360,662,386	$6,088,525,030	5,699.5	$414,459,697
Total	5,829,084,527	72,604,085	$30,070,593,782	$34,076,850,066	31,079.6	$2,266,498,419
NPV			$25,828,281,449	$29,265,970,924		$1,944,081,386

Alternative B

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	324,096,840	3,741,968	$1,646,864,337	$1,857,613,169	1,586.2	$116,150,754
2014	498,471,447	5,772,147	$2,534,365,425	$2,860,933,309	2,470.2	$180,762,844
2015	608,781,830	6,953,057	$3,087,015,381	$3,487,718,707	3,041.5	$222,397,339
2016	702,339,804	7,908,199	$3,551,790,115	$4,015,974,521	3,532.9	$258,138,007
2017	792,002,796	8,915,742	$4,005,049,565	$4,532,279,208	4,027.6	$294,020,100
2018	862,086,150	9,721,843	$4,360,909,885	$4,939,625,954	4,438.4	$323,639,262
2019	934,532,986	10,691,691	$4,740,379,008	$5,374,052,672	4,881.7	$355,571,043
2020	995,119,910	11,526,682	$5,059,759,634	$5,740,867,939	5,268.0	$383,275,862
Total	5,717,431,763	65,231,331	$28,986,133,349	$32,809,065,479	29,246.4	$2,133,955,210
NPV			$24,924,123,009	$28,208,043,598		$1,832,371,794

Alternative C

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	294,129,811	3,273,957	$1,484,218,577	$1,672,904,365	1,410.2	$103,301,862
2014	449,687,220	4,944,467	$2,263,997,314	$2,553,347,411	2,171.4	$159,039,731
2015	540,571,647	5,671,968	$2,698,461,006	$3,045,425,315	2,608.7	$191,073,768
2016	616,652,653	6,460,376	$3,077,407,870	$3,475,454,601	3,004.4	$219,964,543
2017	679,808,129	7,214,625	$3,400,456,485	$3,842,246,885	3,349.5	$245,191,157
2018	723,568,182	7,786,501	$3,628,482,089	$4,102,914,549	3,615.5	$264,425,371

2019	773,638,150	8,375,598	$3,883,842,208	$4,394,568,231	3,906.4	$285,454,047
2020	822,655,907	8,932,525	$4,132,153,864	$4,678,424,636	4,189.9	$305,914,049
Total	4,900,711,699	52,660,017	$24,569,019,415	$27,765,285,992	24,256.0	$1,774,364,526
NPV			$21,170,674,443	$23,922,705,784		$1,527,046,250

Alternative D

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	317,858,919	3,897,232	$1,634,486,283	$1,845,318,081	1,603.2	$117,378,941
2014	491,485,409	6,085,907	$2,532,392,245	$2,861,897,344	2,521.2	$184,397,516
2015	606,677,815	7,551,910	$3,129,291,379	$3,539,516,065	3,155.5	$230,602,679
2016	704,494,252	8,689,291	$3,627,016,154	$4,106,020,338	3,698.6	$270,095,459
2017	797,109,158	9,786,204	$4,099,974,884	$4,645,268,316	4,223.8	$308,144,173
2018	870,212,092	10,739,679	$4,480,742,260	$5,081,480,546	4,672.0	$340,420,221
2019	945,782,092	11,684,696	$4,870,905,767	$5,528,543,168	5,131.5	$373,495,035
2020	1,010,395,298	12,552,468	$5,209,580,484	$5,917,657,888	5,542.3	$402,932,197
Total	5,744,015,034	70,987,386	$29,584,389,456	$33,525,701,748	30,548.2	$2,227,466,220
NPV			$25,422,412,762	$28,805,862,692		$1,911,451,401

Alternative E

Year	Gas (MCF)	Oil (BBLS)	Direct Impact	Total Impact	Employment	Earnings
2013	318,724,940	3,801,664	$1,629,913,672	$1,839,581,696	1,586.7	$116,136,294
2014	492,703,954	5,902,813	$2,521,825,349	$2,848,914,850	2,488.7	$181,952,164
2015	604,505,705	7,265,393	$3,096,031,788	$3,500,343,613	3,091.4	$225,842,833
2016	698,316,896	8,249,909	$3,564,341,513	$4,032,810,859	3,592.2	$262,287,145
2017	787,612,542	9,347,281	$4,023,730,334	$4,556,503,496	4,103.3	$299,376,138
2018	857,779,351	10,266,540	$4,389,551,242	$4,975,460,959	4,532.9	$330,339,916
2019	931,096,889	11,175,941	$4,767,452,261	$5,408,347,042	4,976.9	$362,342,285
2020	993,733,861	12,012,924	$5,095,407,362	$5,784,951,670	5,372.6	$390,737,630
Total	5,684,474,137	68,022,465	$29,088,253,521	$32,946,914,186	29,744.7	$2,169,014,404
NPV			$25,005,503,432	$28,319,313,111		$1,861,946,259

FMR	Ad Valorem	Severance
$100,684,484	$79,649,863	$76,572,824
$155,909,686	$123,422,288	$118,643,161
$192,649,835	$152,587,289	$146,669,519
$223,706,336	$177,220,710	$170,350,313
$252,858,571	$200,382,930	$192,618,649
$278,573,038	$220,887,673	$212,327,325
$303,840,247	$241,047,810	$231,703,019
$326,735,441	$259,349,686	$249,286,455
$1,834,957,637	$1,454,548,248	$1,398,171,265
$1,576,170,287	$1,249,333,587	$1,200,912,658

FMR	Ad Valorem	Severance
$100,646,984	$79,455,352	$76,422,645
$154,852,939	$122,286,059	$117,615,826
$188,584,815	$148,883,904	$143,213,482
$216,928,393	$171,219,211	$164,716,534
$244,512,617	$193,067,791	$185,735,667
$266,089,413	$210,234,616	$202,247,754
$289,101,295	$228,636,962	$219,926,103
$308,455,490	$244,141,719	$234,817,124
$1,769,171,945	$1,397,925,614	$1,344,695,135
$1,521,326,999	$1,202,024,026	$1,156,253,451

FMR	Ad Valorem	Severance
$90,713,584	$71,522,003	$68,811,863
$138,365,222	$109,054,804	$104,932,416
$164,921,471	$129,788,587	$124,926,942
$188,059,410	$148,007,788	$142,465,317
$207,785,917	$163,611,458	$157,469,356
$221,660,098	$174,659,991	$168,085,390

$237,184,077	$186,987,985	$179,941,059
$252,262,587	$198,961,761	$191,459,273
$1,500,952,365	$1,182,594,377	$1,138,091,617
$1,293,374,366	$1,019,019,664	$980,672,522

FMR	Ad Valorem	Severance
$99,882,883	$79,018,851	$75,965,994
$154,707,756	$122,469,724	$117,728,602
$191,124,604	$151,364,149	$145,498,136
$221,468,958	$175,383,263	$168,599,175
$250,241,652	$198,221,353	$190,561,095
$273,319,559	$216,669,403	$208,287,282
$296,977,337	$235,544,664	$226,430,357
$317,493,969	$251,970,602	$242,209,618
$1,805,216,718	$1,430,642,010	$1,375,280,259
$1,551,342,857	$1,229,374,170	$1,181,801,584

FMR	Ad Valorem	Severance
$99,599,398	$78,723,601	$75,699,110
$154,054,593	$121,820,511	$117,136,100
$189,086,615	$149,574,649	$143,819,281
$217,647,636	$172,099,208	$165,500,077
$245,604,579	$194,310,018	$186,852,379
$267,780,734	$212,036,731	$203,884,813
$290,700,951	$230,313,576	$221,453,870
$310,574,025	$246,216,694	$236,731,558
$1,775,048,530	$1,405,094,988	$1,351,077,188
$1,525,987,112	$1,207,870,803	$1,161,437,145

Oil and Gas Production Economic Impact - State Summary (2013-2020)

	Alt A	Alt B	Alt C	Alt D
Impact Estimates				
Gas (MCF)	5,829,084,527	5,717,431,763	4,900,711,699	5,744,015,034
Oil (BBLS)	72,604,085	65,231,331	52,660,017	70,987,386
Direct Impact	$30,070,593,782	$28,986,133,349	$24,569,019,415	$29,584,389,456
Total Impact	$34,076,850,066	$32,809,065,479	$27,765,285,992	$33,525,701,748
Total Jobs	31,080	29,246	24,256	30,548
Total Earnings	$2,266,498,419	$2,133,955,210	$1,774,364,526	$2,227,466,220
FMR	$1,834,957,637	$1,769,171,945	$1,500,952,365	$1,805,216,718
Ad Valorem	$1,454,548,248	$1,397,925,614	$1,182,594,377	$1,430,642,010
Severance	$1,398,171,265	$1,344,695,135	$1,138,091,617	$1,375,280,259
NPV				
Direct Impact	$25,828,281,449	$24,924,123,009	$21,170,674,443	$25,422,412,762
Total Impact	$29,265,970,924	$28,208,043,598	$23,922,705,784	$28,805,862,692
Total Earnings	$1,944,081,386	$1,832,371,794	$1,527,046,250	$1,911,451,401
FMR	$1,576,170,287	$1,521,326,999	$1,293,374,366	$1,551,342,857
Ad Valorem	$1,249,333,587	$1,202,024,026	$1,019,019,664	$1,229,374,170
Severance	$1,200,912,658	$1,156,253,451	$980,672,522	$1,181,801,584
Change from Alternative A				
Gas (MCF)	0	-111,652,764	-928,372,828	-85,069,493
Oil (BBLS)	0	-7,372,754	-19,944,068	-1,616,699
Direct Impact	$0	-$1,084,460,433	-$5,501,574,368	-$486,204,326
Total Impact	$0	-$1,267,784,587	-$6,311,564,073	-$551,148,318
Total Jobs	0.0	-1,833.2	-6,823.5	-531.4
Total Earnings	$0	-$132,543,209	-$492,133,892	-$39,032,199
FMR	$0	-$65,785,691	-$334,005,272	-$29,740,918
Ad Valorem	$0	-$56,622,634	-$271,953,871	-$23,906,238
Severance	$0	-$53,476,130	-$260,079,648	-$22,891,006
Direct Impact	$0	($904,158,440)	($4,657,607,006)	($405,868,687)
Total Impact	$0	($1,057,927,326)	($5,343,265,139)	($460,108,231)
Total Earnings	$0	($111,709,593)	($417,035,137)	($32,629,985)
FMR	$0	($54,843,288)	($282,795,921)	($24,827,431)
Ad Valorem	$0	($47,309,561)	($230,313,923)	($19,959,417)
Severance	$0	($44,659,207)	($220,240,135)	($19,111,073)
Gas (MCF)	0.0%	-1.9%	-15.9%	-1.5%
Oil (BBLS)	0.0%	-10.2%	-27.5%	-2.2%

Direct Impact	0.0%	-3.6%	-18.3%	-1.6%
Total Impact	0.0%	-3.7%	-18.5%	-1.6%
Total Jobs	0.0%	-5.9%	-22.0%	-1.7%
Total Earnings	0.0%	-5.8%	-21.7%	-1.7%
FMR	0.0%	-3.6%	-18.2%	-1.6%
Ad Valorem	0.0%	-3.9%	-18.7%	-1.6%
Severance	0.0%	-3.8%	-18.6%	-1.6%
Direct Impact	0.0%	-3.5%	-18.0%	-1.6%
Total Impact	0.0%	-3.6%	-18.3%	-1.6%
Total Earnings	0.0%	-5.7%	-21.5%	-1.7%
FMR	0.0%	-3.5%	-17.9%	-1.6%
Ad Valorem	0.0%	-3.8%	-18.4%	-1.6%
Severance	0.0%	-3.7%	-18.3%	-1.6%

Alt E

5,684,474,137
68,022,465
$29,088,253,521
$32,946,914,186
29,745
$2,169,014,404
$1,775,048,530
$1,405,094,988
$1,351,077,188

$25,005,503,432
$28,319,313,111
$1,861,946,259
$1,525,987,112
$1,207,870,803
$1,161,437,145

-144,610,390
-4,581,620
-$982,340,261
-$1,129,935,880
-1,334.9
-$97,484,015
-$59,909,107
-$49,453,261
-$47,094,077

($822,778,017)
($946,657,813)
($82,135,127)
($50,183,175)
($41,462,784)
($39,475,513)

-2.5%
-6.3%

Economic Impacts of Oil and Gas Production for the State o

	Alternative A
Direct Economic Output	$25,828,281
% Difference from Alternative A	N.A.
Total Economic Output	$29,265,971
% Difference from Alternative A	N.A.
Total Labor Earnings	$1,944,081
% Difference from Alternative A	N.A.
Total Jobs in 2020	5,699.5
% Difference from Alternative A	N.A.
Ad Valorem Taxes	$1,249,334
% Difference from Alternative A	N.A.
Severance Taxes	$1,200,913
% Difference from Alternative A	N.A.
FMR	$1,576,170
% Difference from Alternative A	N.A.

N.A.: Not Applicable

FMR: Federal Mineral Royalties (portion accruing to the State of Wyoming)

All figures are for wells on federal mineral estate only.
Analysis incorporates estimated growth in annual production. Estimates are
over time, c) estimated average co-production rates (oil from gas wells, gas
Tax and FMR figures are based on the estimated sales value of oil and gas

All dollar figures are present values based on a 3 percent annual real discou

-3.3%
-3.3%
-4.3%
-4.3%
-3.3%
-3.4%
-3.4%

-3.2%
-3.2%
-4.2%
-3.2%
-3.3%
-3.3%

f Wyoming through 2020 (1,000s of 2011$)

Alternative B	Alternative C	Alternative D	Alternative E
$24,924,123	$21,170,674	$25,422,413	$25,005,503
-3.5%	-18.0%	-1.6%	-3.2%
$28,208,044	$23,922,706	$28,805,863	$28,319,313
-3.6%	-18.3%	-1.6%	-3.2%
$1,832,372	$1,527,046	$1,911,451	$1,861,946
-5.7%	-21.5%	-1.7%	-4.2%
5,268.0	4,189.9	5,542.3	5,372.6
-5.9%	-22.0%	-1.7%	-4.3%
$1,202,024	$1,019,020	$1,229,374	$1,207,871
-3.8%	-18.4%	-1.6%	-3.3%
$1,156,253	$980,673	$1,181,802	$1,161,437
-3.7%	-18.3%	-1.6%	-3.3%
$1,521,327	$1,293,374	$1,551,343	$1,525,987
-3.5%	-17.9%	-1.6%	-3.2%

based on a) increasing numbers of wells in operation each year, b) average per well production decline curves
from oil wells), all as provided by the BLM RMG.
production.

nt rate.

From: Miller, Chris J -FS [chrismiller@fs.fed.us]
Sent: Monday, June 3, 2013 4:25 PM
To: Sidon, Joshua B (jsidon@blm.gov); Fetter, Rob; Uriarte, Alex
Subject: Lands/ROW effects UT, NV, ID
Attachments: Utah ch4 - qualitative or discussion questions - for FS (3)_cjm.docx; GRSG_UT-SR_Alternatives A-B-C-D-E matrix_for Impact Analysis_2013-03-04.pdf; ID swMT Alternatives Summary 013013.docx

Importance: High

As I looked at these files a little closer – it appears there is some detailed ROW numbers for UT (which are moot for now), some highly qualitative ROW effects for ID, and a missing document for NV. I sent an email to Madelyn requesting NV file and if/when more quantitative information might be available for ID.

So, probably not much help for now – I'll send whatever else comes in.
Chris

From: Dillon, Madelyn -FS
Sent: Friday, May 31, 2013 3:58 PM
To: Miller, Chris J -FS
Subject: FW: social econ Qs for UT
Importance: High

Here's a streamlined alternative matrix for NV and a summary of alts for ID. I have individual more detailed alts for ID, if you'd like, but the summary will likely be sufficient.

Madelyn Dillon
USDA Forest Service
2150A Centre Avenue Suite 300
Fort Collins, CO 80526
970-295-5734 (office)
970-619-0709 (cell)
http://fsweb.wo.fs.fed.us/bass/pa/index.html

From: Dillon, Madelyn -FS
Sent: Friday, May 31, 2013 2:26 PM
To: Miller, Chris J -FS
Subject: FW: social econ Qs for UT
Importance: High

I understand that the contractor wanted a response by 5/17 . . . better late than never, I suppose. My apology for the unavoidable delay and any problems it might have caused.

Rather than trying to craft a statement that adequately addresses the need (as I understand it), I thought it might be helpful to send you the alternative matrix for UT, which will provide specific, detailed information that might be most helpful in providing the data/information needed. I've highlighted in yellow the lands and realty section and a simple "find" will locate the section using "lands and realty."

Madelyn Dillon
USDA Forest Service
2150A Centre Avenue Suite 300
Fort Collins, CO 80526
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http://fsweb.wo.fs.fed.us/bass/pa/index.html

From: Reis, David -FS
Sent: Thursday, May 16, 2013 1:09 PM
To: Miller, Chris J -FS
Cc: Rodriguez, Ron -FS; Stein, Glen -FS; Dillon, Madelyn -FS; Harber, Dale -FS
Subject: RE: social econ Qs for UT
Importance: High

Chris, I have a lengthy statement on recreation. I have no idea how to better state my ramblings than the comment within. If I'm missing the mark, let me know, and we can talk this through with the contractor. Thanks, Dave

David Reis – Forest Landscape Architect
Asst. Rec. & Wild. Prgm. Mgr.
Humboldt-Toiyabe National Forest - Sparks, Nevada
USFS Sage-Grouse NEPA Support ID Team (NeST)
dreis@fs.fed.us
Office 775-352-1267 Cell 775-770-4654

From: Miller, Chris J -FS
Sent: Wednesday, May 15, 2013 10:31 AM
To: Rodriguez, Ron -FS; Stein, Glen -FS
Cc: Dillon, Madelyn -FS; Reis, David -FS; Harber, Dale -FS
Subject: social econ Qs for UT

Hi all,

Given that the econ contractor is being asked to complete the chap 4 section without having other sections of chapter 4 from which to work from, Rob Fetter at ICF has crafted a set of questions to solicit information for specialists to try and solicit information in absence of having chapter 4. I have highlighted areas in the attached file, along with your names in comment bubbles, that you may be able to provide some information to help out ICF so they have something to work with. Could you take a look at those areas and see if you would like to provide some feedback for UT (as well as NV and ID/MT subregions – but UT is priority at the moment) by end of this week?

Ron – we continue to try and work with Tim and Dustin to get the grazing AUM data to ICF but there is a long list of GIS requests – so there's a bottle neck that's keeping us from getting the data in time to ICF. We may not be able to get FS grazing economic impacts in on time for this draft of the UT subregional chapter 4. Hopefully having a gap is ok for that. Also curious to know if you received any more feedback from forests about ROWs (as indicated in Rob's email below)?

Sorry again about the chaotic nature of these requests (perhaps you've already received these requests from someone else), but this has been a coordination struggle.

Thanks,
Chris

From: Fetter, Rob [mailto:Rob.Fetter@icfi.com]
Sent: Monday, May 13, 2013 4:37 PM
To: Miller, Chris J -FS; Uriarte, Alex
Cc: Uriarte, Alex
Subject: RE: FS data status

Chris,

The main thing we are still waiting for on Utah is grazing data from Dustin – see the attached spreadsheet. Also, your email of 5/9 indicated that Ron Rodriguez still might be checking with UT forests about utility/energy corridor effects, and Ron's email didn't seem to address that point. So, if there's an update on that that would be great.

I also wanted to send you this set of questions we asked BLM regarding "qualitative" effects – these are the questions we were going to review their chapter 4 sections for, but when they were not able to send us the ch4 sections they asked for questions instead. I believe most/all of these will not apply for FS resources (or have been / will be addressed in existing data requests, such as the ROW question) but wanted to send these to you anyway.

Sorry for the delay – I know it's late in the day now. Nonetheless, if you have time to talk that would be great.

Rob

T. ROBERT FETTER | Program Manager & Sr Environmental Economist | 303.585.1265 (m) | rfetter@icfi.com | icfi.com

ICF INTERNATIONAL | 8310 S. Valley Highway, Suite 240, Englewood, CO 80112

From: Miller, Chris J -FS [mailto:chrismiller@fs.fed.us]
Sent: Monday, May 13, 2013 4:28 PM
To: Fetter, Rob; Uriarte, Alex
Subject: FS data status

Hi Rob, Alex,

Did you want to talk to day about data needs/updates? I might be unavailable for much of the time between Tuesday and Thursday this week.

I know that the ID subregional team is having an id team meeting beginning tomorrow and they will be discussing social/economic issues from 930 to 11am MT – would either or both of you be available at that time in case they want you to participate?

Chris

Alternatives

Please provide a description of the alternatives (brief is fine – we would just like some information to characterize them). Do the alternatives result in deterministic closure/open/restricted use areas, or are there zones in which a certain amount of disturbance will be permitted, up to a cap, but it is not currently known where the disturbance will be permitted and where the cap will bind?

Cumulative

If there is already a list of past, present and reasonably foreseeable future projects that the cumulative effects analysis will take into consideration, please provide it.

We would especially like to know if the sage grouse management actions in neighboring sub-regions should be considered as reasonably foreseeable future actions.

If there is guidance on the expected level of geographic detail for the cumulative analysis, or other aspects of the cumulative analysis, please provide it.

Cross-Cutting (e.g., could be lands and realty, travel management, oil and gas, locatable or salable minerals, grazing, and/or recreation)

Given the pattern of land ownership in some areas – especially areas where there are blocks of state land surrounded by federal land – does BLM (or FS) foresee impacts on the value of state lands, or the ability of operators, developers or other users, to access resources on state lands, resulting from the alternatives? If so, please characterize this as much as possible, including geographic region of effect, restrictions on seasonality or timing, and nature / extent of impact.

Commented [MCJ-1]: Ron, Glen?

Note: Bill Stevens brought up this issue in the fall. He noted that the state is likely to argue that any restrictions on BLM lands that surround state in-holdings will adversely impact the value of those state lands. For example, if surrounding BLM lands are closed to grazing, any isolated state sections will lose all their value for that resource, eliminating any fee revenue to the state from grazing. Similarly, restrictions on minerals development on BLM lands could reduce the value of minerals development on state lands (although Bill allowed that he does not think this is as likely as the grazing scenario).

Land and Realty

Is there any information about how the alternatives would affect land management, including transmission line ROWs, in a way that could result in economic impacts? For instance, if developers would incur additional mitigation costs if they choose to develop ROWs in or near habitat, this could result in economic impacts. Is this a possibility? (If so, please characterize it, including information about where, what types of ROWs would be affected, and to what extent.) Are there other types of impacts where management of lands, realty or ROWs might result in economic impacts?

Commented [MCJ-2]: Madelyn?

Travel Management

Is there any information about how the alternatives would affect travel management in a way that could result in economic impacts? For instance, if travel would be restricted or banned in certain areas or for certain seasons, this could result in reduced economic activity or higher costs for some business and residential users of access routes. Is this a possibility? (If so, please characterize it, including available information about where, what types of travel routes would be affected, what the affected travel routes are currently used for, and the extent and nature of the restrictions.) Are there other types of impacts where travel management might result in economic impacts?

Commented [MCJ-3]: Ron, Glen?

Salable Minerals

Does the team predict the alternatives would have any impacts on development or production of salable minerals? For instance, these might manifest due to seasonal restrictions, restrictions on travel or access routes, or some other mechanism. If there would be impacts, such that production of salable minerals might differ across the alternatives, please characterize the expected differences in production with respect to geography, timing, and by alternative.

Commented [MCJ-4]: Dale?

Locatable Minerals

Does the team predict the alternatives would have any impacts on development or production of locatable minerals? For instance, these might manifest due to seasonal restrictions, restrictions on travel or access routes, or some other mechanism. If there would be impacts, such that production of locatable minerals might differ across the alternatives, please characterize the expected differences in production with respect to geography, timing, and by alternative.

Commented [MCJ-5]: Dale?

Grazing

In alternatives C1 and C2, would ranchers have to bear the costs of fencing or other barriers to avoid their cattle moving onto public lands that are currently open to grazing, but would be closed in the alternatives?

Is it common for ranchers to have their cattle graze on both Federal and neighboring State (SITLA) lands, and is there information on how much grazing would be affected in SITLA lands by alternatives C1 and C2? If grazing on State lands would be affected, we would appreciate as much geographic detail as possible (ideally county level).

Any idea of the extent to which some grazing operations might became no longer viable under alternatives C1 and C2 and in what counties that might happen? Any idea for how this might vary by size of operator or other ranch characteristics?

Recreation

We understand the recreation specialist expects the alternatives will not have systematic impacts on recreation that would result in quantifiable differences among RVDs. We are wondering if that person would project more subtle changes, even if not quantifiable. For instance, last fall, BLM's Bill Stevens speculated that:

Commented [MCJ-6]: Dave?

- Offices with recent RMP’s will not likely show much recreation change from the sage grouse EIS, with the possible exception of (sage grouse) hunting. Most of these plans greatly limit cross-country OHV use, with travel limited to existing or designated roads.
- Field offices without recent RMP’s may show more differences, especially where cross-country OHV use is currently allowed within sage grouse areas.

Another possibility is that sage grouse habitat conservation actions might create a condition in which there would be more opportunities for relatively primitive recreation activities (e.g., backcountry camping) and fewer opportunities for relatively developed activities (e.g., OHV use). Even if these differences cannot be quantified in terms of changes in RVDs, it may still be valuable to address them qualitatively. So - whether or not these specific ideas would be borne out - the upshot of our question is whether the recreation specialist believes there would be any differences in recreation activity across the alternatives, and how those would be characterized.

If there are differences, we would appreciate getting as much detail as possible on geographic location as well as types of activities.

Commented [dr7]: It’s possible that sage grouse habitat could limit developed and dispersed recreation once we overlay existing habitat over current recreation activities and see where those effects could be.
An example: a campground that’s been there for years, and we discover that campground is adjacent to a lek, or within primary habitat. Do we close it? Move it?
An example: dispersed recreation activities abound. Motorized and non-motorized. Again, overlays will determine impacts and effects. People hiking too close to leks and primary habitat. Move the trail? Motorized OHV creates too much noise and dust,…keep it, or re-route it, or close it?
I realize I’m talking about project-level NEPA here, but for the EIS and a programmatic look, these are the kinds of impacts I think about regarding recreation.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
Note: Management identified in the alternatives will not apply in instances where the management in the No Action Alternative are more restrictive. For example, if an existing RMP decision closes an area to fluid mineral leasing (e.g., because of an ACEC or WSA), an alternative that considers making overlapping GRSG habitat NSO would not change the closed area to NSO; rather, the closed area present in the No Action Alternative would continue as sufficient to also meet the management under the alternative in this example.				
Theme: No Action Alternative	Theme: NTT Recommendations	Theme: NTT+ Measures Proposed by Conservation Groups During Scoping	Theme: Sub-Regional Alternative	Governor's EO – State of Utah (Wyoming for portions of Uinta & Ashley NF)
Special Status Species – Greater Sage-Grouse (GRSG)				
GOAL:				
With exception of the Uinta LRMP, goals have not been developed specifically for greater sage-grouse (GRSG). However, all LUPs include a goal to work with partners to protect, maintain, and enhance habitat for special status species.	Maintain and/or increase Greater Sage-Grouse (GRSG) abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in cooperation with other conservation partners.	Maintain and increase current Greater Sage-Grouse (GRSG) abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem.	Maintain or increase state-wide Greater Sage-Grouse (GRSG) populations by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in cooperation with other conservation partners. Maximize benefits to GRSG habitats and populations in priority habitat.	Protect, maintain, improve and enhance Greater Sage-Grouse (GRSG) populations and habitats within the State of Utah established Sage-Grouse Management Areas. (For the purposes of this planning document, identified habitat within the Sage-Grouse Management Areas identified by the State of Utah is priority habitat under Alternative E1.)
Objectives:				
In general, older plans do not include objectives specific to GRSG. More recent plans (those completed after 2000) may include an objective to advance conservation of the GRSG and GRSG habitat, although a mechanism for achieving GRSG specific objectives is infrequently identified.	Designate priority sage-grouse habitats for each Western Association of Fish and Wildlife Agencies (WAFWA) management zone across the current geographic range of sage-grouse that are large enough to stabilize populations in the short term and enhance populations over the long term. Protect priority sage-grouse habitats from anthropogenic disturbances that will reduce distribution or abundance of sage-grouse.	Establish a system of sagebrush reserves to anchor recovery efforts by protecting the highest quality habitats.	Identify and protect priority sage-grouse habitats from anthropogenic and natural disturbances that will reduce distribution or abundance of sage-grouse.	Protect habitat which provides for the year-round life-cycle needs of the GRSG. Sustain the best-of-the-best existing GRSG populations. Perpetuate conditions necessary to ensure recruitment of a continuing population within the aggregate state population. Enhance or improve GRSG habitat that has been impaired or altered through restoration or rehabilitation activities. Eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Sustain the best-of-the-best existing sage-grouse populations and increase populations through habitat restoration and rehabilitation.
Recently completed BLM plans include a management action to implement the most recent *UDWR Strategic Management Plan for Sage-Grouse* (UDWR, 2000), the *BLM National Sage Grouse Habitat Conservation Strategy* (BLM, 2004), and	To maintain or increase current populations of GRSG, manage or restore priority habitat so that at least 70% of the land cover provides adequate sagebrush habitat to meet sage-grouse needs.	Restore and maintain sagebrush steppe to its ecological potential in priority, general and restoration GRSG habitat.	Within priority habitat where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description, maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing,	Enhance an average of 25,000 acres of GRSG habitat in priority habitat annually. Increase the total amount of GRSG habitat acreage within and adjacent to priority habitat by an average of 50,000 acres per

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
recommendations from local sage-grouse working groups, to protect, maintain, enhance, and restore GRSG populations and habitat. A few plans including more detailed habitat objectives that include land cover.			winter, and transition areas. Desired cover percentages and heights for sagebrush, grasses, and forbs in seasonal habitats will follow habitat guidelines from scientific literature (e.g., Connelly et al. 2000, Hagen et al. 2007). Adjustments from the guidelines may be made, but must be based on documented regional variation of habitat characteristics (e.g., sagebrush type, ecological site potential), quantitative data from population and habitat monitoring, and evaluation of local research.	year, through management actions targeting Opportunity Areas.
No similar action.	No similar action.	Increase GRSG populations to a level where they are viable and secure from local extirpation events, and eventually to a level that allows for an annual harvestable surplus.	No similar action.	Sustain an average male lek count of 4,100 males (based on a ten-year rolling average on a minimum of 200 monitored leks) in the priority habitat, and increase the population of males to an average of 5,000 (based on the same ten-year rolling average on a minimum of 200 monitored leks) within the priority habitat. Maintain viable populations within each SGMA. Ensure a path for birds to migrate within SGMAs on a seasonal basis, and ensure a long-term genetic connection between populations as needed. Should the population trends within a population area temporarily or permanently suffer from the effects of factors such as wildfire, management controls in the other SGMAs will be adjusted to achieve the other objectives listed above.
Under current management, there is no designated general habitat.	Quantify and delineate general habitat for capability to provide connectivity among priority areas.	No similar action.	Delineate and manage occupied GRSG habitat outside priority habitat as general habitat. Maintain general habitat for continued use by GRSG and manage according to the decisions identified below and with mitigations identified on a case-by-case basis to address local ecological variations, but allow for mitigating impacts within general habitat through off-site mitigation (e.g., improve or increase habitat in priority habitat or opportunity areas).	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

<table>
<tr><th>Alternative A</th><th>Alternative B</th><th>Alternative C</th><th>Alternative D</th><th>Alternative E1</th></tr>
<tr><td></td><td></td><td></td><td>Manage general habitat (see Map XX) for at least 28-49% sagebrush cover across the landscape (not percent cover at site-specific monitoring), where applicable given ecological variations.</td><td></td></tr>
<tr><td>All land use plans include a general commitment to coordinate management actions with state and local governments and non-governmental organizations.</td><td>No similar action.</td><td>No similar action.</td><td>Participate in local GRSG conservation efforts (e.g., DWR, NRCS, local working groups) to implement landscape-scale habitat conservation, to implement consistent management to benefit GRSG, and to gather and use local research and monitoring to promote the conservation of GRSG.</td><td>The State of Utah will coordinate the efforts of BLM, Forest Service, FWS, state agencies, local government and others to accomplish the purposes of this Plan. The State will convene a Working Group with membership including the Department of Natural Resources, Department of Agriculture and Food, State Institutional Trust Lands Administration, BLM, FS, Natural Resources Conservation Service, FWS, and other as needed. The Working Group will meet as often as needed to coordinate the implementation of the State Sage-Grouse Plan (included in this alternative). The Working Group will initiate and coordinate the efforts of necessary technical teams to assure scientific and monitoring information is shared by all management agencies, and that efforts to achieve the necessary conservation goals are progressing.</td></tr>
<tr><td><u>Management Actions</u></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Under current management, there is no designated priority or general habitat.</td>
<td>Identify priority and general habitat as follows (Map X):
<table>
<tr><th rowspan="2">Population Area</th><th colspan="2">Acres</th></tr>
<tr><th>Priority</th><th>General</th></tr>
<tr><td>Uintah</td><td>348,400</td><td>294,200</td></tr>
<tr><td>Carbon</td><td>128,200</td><td>46,600</td></tr>
<tr><td>Emery</td><td>81,500</td><td>6,200</td></tr>
<tr><td>Parker Mountain</td><td>524,800</td><td>7,000</td></tr>
<tr><td>Panguitch</td><td>221,600</td><td>0</td></tr>
<tr><td>Bald Hills</td><td>256,800</td><td>10,700</td></tr>
<tr><td>Hamlin Valley</td><td>101,000</td><td>0</td></tr>
<tr><td>Sheeprocks</td><td>463,100</td><td>52,800</td></tr>
<tr><td>Ibapah</td><td>47,000</td><td>10,100</td></tr>
</table></td>
<td>Identify priority and general habitat as follows (Map X):
<table>
<tr><th rowspan="2">Population Area</th><th colspan="2">Acres</th></tr>
<tr><th>Priority</th><th>General</th></tr>
<tr><td>Uintah</td><td>642,600</td><td>0</td></tr>
<tr><td>Carbon</td><td>174,800</td><td>0</td></tr>
<tr><td>Emery</td><td>87,700</td><td>0</td></tr>
<tr><td>Parker Mountain</td><td>531,800</td><td>0</td></tr>
<tr><td>Panguitch</td><td>221,600</td><td>0</td></tr>
<tr><td>Bald Hills</td><td>267,500</td><td>0</td></tr>
<tr><td>Hamlin Valley</td><td>101,000</td><td>0</td></tr>
<tr><td>Sheeprocks</td><td>515,900</td><td>0</td></tr>
<tr><td>Ibapah</td><td>57,100</td><td>0</td></tr>
</table></td>
<td>Identify priority and general habitat as follows (Map X):
<table>
<tr><th rowspan="2">Population Area</th><th colspan="2">Acres</th></tr>
<tr><th>Priority</th><th>General</th></tr>
<tr><td>Uintah</td><td>348,400</td><td>294,200</td></tr>
<tr><td>Carbon</td><td>136,200</td><td>38,600</td></tr>
<tr><td>Emery</td><td>81,500</td><td>6,200</td></tr>
<tr><td>Parker Mountain</td><td>524,800</td><td>7,000</td></tr>
<tr><td>Panguitch</td><td>198,100</td><td>23,500</td></tr>
<tr><td>Bald Hills</td><td>256,800</td><td>10,700</td></tr>
<tr><td>Hamlin Valley</td><td>101,000</td><td>0</td></tr>
<tr><td>Sheeprocks</td><td>409,200</td><td>106,700</td></tr>
<tr><td>Ibapah</td><td>47,000</td><td>10,100</td></tr>
</table></td>
<td>Identify priority and general habitat and opportunity areas as follows (Map X):
<table>
<tr><th rowspan="2">Population Area</th><th colspan="2">Acres</th></tr>
<tr><th>Priority</th><th>General</th></tr>
<tr><td>Uintah</td><td>340,800</td><td>301,800</td></tr>
<tr><td>Carbon</td><td>27,700</td><td>147,100</td></tr>
<tr><td>Emery (State merges with Parker)</td><td>80,600</td><td>7,100</td></tr>
<tr><td>Parker Mountain</td><td>520,700</td><td>8,480</td></tr>
<tr><td>Panguitch</td><td>221,600</td><td>0</td></tr>
<tr><td>Bald Hills</td><td>265,400</td><td>2,000</td></tr>
<tr><td>Hamlin Valley</td><td>101,000</td><td>0</td></tr>
<tr><td>Sheeprocks</td><td>417,700</td><td>109,500</td></tr>
<tr><td>Ibapah</td><td>48,000</td><td>10,100</td></tr>
</table></td></tr>
</table>

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

<table>
<tr><th>Alternative A</th><th>Alternative B</th><th>Alternative C</th><th>Alternative D</th><th>Alternative E1</th></tr>
<tr>
<td></td>
<td><table>
<tr><td>Box Elder</td><td>364,100</td><td>49,000</td></tr>
<tr><td>Rich</td><td>180,200</td><td>1,200</td></tr>
<tr><td>Lucerne</td><td>0</td><td>2,300</td></tr>
<tr><td>Strawberry</td><td>40,200</td><td>0</td></tr>
<tr><td>WY-Uinta</td><td>1,100</td><td>20,900</td></tr>
<tr><td>WY-Blacks Fork</td><td>23,700</td><td>31,100</td></tr>
<tr><td>Statewide</td><td>2,781,700</td><td>532,100</td></tr>
</table></td>
<td><table>
<tr><td>Box Elder</td><td>413,100</td><td>0</td></tr>
<tr><td>Rich</td><td>181,400</td><td>0</td></tr>
<tr><td>Lucerne</td><td>2,300</td><td>0</td></tr>
<tr><td>Strawberry</td><td>40,200</td><td>0</td></tr>
<tr><td>WY-Uinta</td><td>22,000</td><td>0</td></tr>
<tr><td>WY-Blacks Fork</td><td>54,800</td><td>0</td></tr>
<tr><td>Statewide</td><td>3,313,800</td><td>0</td></tr>
</table></td>
<td><table>
<tr><td>Box Elder</td><td>412,100</td><td>1,000</td></tr>
<tr><td>Rich</td><td>180,200</td><td>1,200</td></tr>
<tr><td>Lucerne</td><td>0</td><td>2,300</td></tr>
<tr><td>Strawberry</td><td>40,200</td><td>0</td></tr>
<tr><td>WY-Uinta</td><td>1,100</td><td>20,900</td></tr>
<tr><td>WY-Blacks Fork</td><td>23,700</td><td>31,100</td></tr>
<tr><td>Statewide</td><td>2,760,300</td><td>553,500</td></tr>
</table>

Within the mapped priority and general habitat there may be areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, pinyon/juniper ecological sites, or towns. These areas of non-habitat would be identified during site-specific project review by agency biologists, in discussion with UDWR and other agencies, as appropriate. Decisions associated with priority or general habitat would apply to areas with or ecologically capable of supporting GRSG habitat. The decisions may be excepted if it can be shown that the action would occur in a non-habitat area and the following conditions are met:

access through GRSG habitat to the activity in the non-habitat area occurs only on existing routes, and no new roads, maintenance, or improvements to roads would be required within GRSG habitat,
no activity would be permitted or authorized if it would establish a valid existing right that would subsequently require construction of new routes within GRSG habitat for access,
access to the activity for construction, maintenance, etc. would be required to avoid applicable GRSG sensitive seasons (i.e., breeding, brood-rearing, winter) and time periods (2-hours before sunrise to 2-hours after sunrise near leks during breeding season),
the non-habitat does not provide
</td>
<td><table>
<tr><td>Box Elder</td><td>439,200</td><td>5,800</td></tr>
<tr><td>Rich</td><td>183,000</td><td>4,500</td></tr>
<tr><td>Lucerne</td><td>0</td><td>2,300</td></tr>
<tr><td>Strawberry</td><td>40,700</td><td>0</td></tr>
<tr><td>WY-Uinta</td><td>1,100</td><td>20,900</td></tr>
<tr><td>WY-Blacks Fork</td><td>23,700</td><td>31,100</td></tr>
<tr><td>Statewide</td><td>2,711,200</td><td>650,680</td></tr>
</table>

Non-habitat areas within mapped priority habitat include lands that do not contribute to the annual life-cycle of sage-grouse. Effort has been made to minimize the amount of non-habitat within priority habitat, but given the topographic, physiographic and land cover features within Utah and the scale and detail of mapping, the inclusion of some non-habitat was unavoidable.

No specific management provisions are proposed for non-habitat areas within priority habitat, except to consider noise and permanent structure stipulations around a lek, and to note that, birds may fly over the non-habitat as they connect to other populations or seasonal habitat areas. (Corridors may or may not be included as habitat within the population area, depending on local conditions, topography, and other factors. Corridors are important to GRSG, but may not require restrictions on human activity. As a general rule, it will be adequate to avoid removal of sagebrush and to minimize development that would create a physical barrier to GRSG movement in these areas.)

The maps contain representations of the boundaries for informational purposes, but are not meant to represent a survey-grade boundary and are not intended to be the final authority for habitat delineation issues. Parties should discuss with the DWR to determine the precise delineation of habitat as part of the coordination process for any</td>
</tr>
</table>

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			important connectivity between habitats, • impacts to adjacent priority habitat areas can be reduced or eliminated (e.g., sound, tall structures). Adjust priority and general habitat boundaries within population area boundaries based on habitat condition, restoration efforts, population data, and discussions with UDWR. Adjustments will be based on the ability to meet GRSG goals and priority habitat objectives. Proposed projects within population areas will consider impacts to GRSG and potential mitigation measures when preparing site-specific planning and environmental compliance documents.	particular development proposal. If in the review of any proposal or other action, differences between the maps and the on-the-ground situation become apparent, the on-the-ground boundaries should control. Refine maps of habitat, non-habitat, and opportunity areas during implementation. Map refinement efforts should be coordinated among federal, state and local agencies, and private landowners who may choose to participate. On-the-ground projects may contribute to this refined mapping for the project area. Priority habitat should be reviewed annually through the coordination efforts of the Public Lands Policy Coordination Office (PLPCO). Review should include, for example, changes in the distribution of disturbance, the increases in habitat through enhancement or improvement, decreases in habitat through wildfire or other events, status of population numbers, and related items. Adjustments to priority habitat will be reviewed every five years, unless large-scale events such as wildfire, and successful annual events, such as habitat enhancement or improvement, necessitate a more frequent adjustment. Adjustments may include expansion or constriction of the external boundaries and a redrawing of the internal boundaries among habitat, non-habitat and opportunity areas.
Recently completed BLM plans include a management action to implement the most recent *UDWR Strategic Management Plan for Sage-Grouse* (UDWR, 2000), the *BLM National Sage Grouse Habitat Conservation Strategy* (BLM, 2004), and recommendations from local sage-grouse working groups, to protect, maintain, enhance, and restore GRSG populations and habitat. A few plans (e.g., Vernal RMP, Uinta LRMP)	Develop quantifiable habitat and population objectives with WAFWA and other conservation partners at the management zone and/or other appropriate scales. Develop a monitoring and adaptive management strategy to track whether these objectives are being met, and allow for revisions to management approaches if they are not.	No similar action.	Increase the amount and functionality of seasonal habitats within priority habitat: • Maintain or increase canopy cover and average patch size of sagebrush in perennial grasslands. As applicable, Utah prairie dog habitat requirements shall be taken into consideration when the maintenance of or increases in sagebrush canopy cover and patch size are considered. • Maintain or increase the amount, condition and connectivity of seasonal	Enhance an average of 25,000 acres of GRSG habitat in priority habitat annually. Increase the total amount of GRSG habitat acreage within and adjacent to priority habitat by an average of 50,000 acres per year, through management actions targeting Opportunity Areas. Manage activities within priority habitat based on a hierarchical protocol that provides as follows:

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
including more detailed habitat objectives such as desired seral sage, percent canopy cover, or height. Other than the abovementioned decision, and basic planning allocations, management actions specific to GRSG are not present in most land use plans.			habitats within, and where applicable, between population areas. • Protect and improve GRSG migration/ movement corridors. • Reduce conifer encroachment within GRSG priority habitat. • Maintain or improve understory (grass, forb) and/or riparian condition within breeding and late brood-rearing habitats. • Reduce the extent of annual grasslands adjacent to priority habitat where objectives are not being met. Develop a monitoring and adaptive management strategy to track whether the habitat objectives are being met, and allow for revisions to management approaches if they are not.	1. Avoidance of disturbance to habitat or birds by an activity is the preferred option; 2. Minimization of the disturbance is desired if the disturbance cannot be avoided in greater sage-grouse habitat, with mitigation for the effects of the minimization decisions; and finally 3. Mitigation of the disturbance from an activity within sage grouse habitat is required if a disturbance cannot be avoided. Manage areas identified as priority habitat to avoid surface disturbance to the greatest degree possible. Coordinate with the DWR when land use which may result in a disturbance is contemplated. All existing uses are explicitly recognized by this alternative and shall not be affected by the implementation of this alternative. The sage-grouse conservation measures identified in the associated NEPA documents for each of these projects would continue to be implemented to protect GRSG and its habitat. Provisions of this plan would not be added to the measures identified each specific project.
No similar action.	Manage priority sage-grouse habitats so that discrete anthropogenic disturbances cover less than 3% of the total sage-grouse habitat regardless of ownership. Anthropogenic features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, homes, and mines. • In priority habitats where the 3% disturbance threshold is already exceeded from any source, no further anthropogenic disturbances will be permitted by the BLM or the Forest	Limit discrete surface disturbance in priority GRSG habitat to one instance per section of GRSG habitat regardless of ownership, with no more than 3% surface disturbance (or, where stipulated, implement the disturbance cap prescribed in the applicable state conservation plan, whichever is more protective). The 3% cap includes existing and all new initial disturbance to the landscape, interim mitigation and restoration efforts notwithstanding. Discrete disturbances include but are not limited to highways, roads, transmission lines, substations, wind turbines, oil and gas wells, heavily grazed areas, range developments, severely burned	Protect priority habitat from fragmentation by anthropogenic disturbances that will reduce distribution or abundance of GRSG by managing priority habitat so that discrete anthropogenic disturbances cover less than 5% of the area within priority habitat used by a population of GRSG, regardless of ownership. While the BLM and FS do not have any regulatory authority to influence the amount of disturbance that will occur on state or private land, when determining whether development is appropriate on Federal lands, disturbances on private and state lands will count towards the 5% disturbance cap.	The provisions of this alternative include, under certain circumstances, a general limit on new permanent disturbance of 5% of habitat on state or federally managed lands within any particular State of Utah Sage-Grouse Management Area. The fundamental purpose of this provision is to limit the effects of a large amount of disturbance to the existing habitat or activities of the GRSG. The cumulative calculation of permanent disturbance in any population area, and specific habitats within a population area, is the aggregate of the various project, land use, or natural event disturbances, as modified by the effects of rehabilitation,

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	Service until enough habitat has been restored to maintain the area under this threshold (subject to valid existing rights). • In this instance, an additional objective will be designated for the priority area to prioritize and reclaim/restore anthropogenic disturbances so that 3% or less of the total priority habitat area is disturbed within 10 years.	areas, pipelines, landfills, mines, and vegetation treatment that reduces sagebrush cover. As additional research on the 3% cap becomes available, revise this prescription, as necessary, to conserve GRSG. For an area to no longer be considered disturbed under the 3% cap, disturbances need to be restored/reclaimed, where technically and legally feasible (e.g., valid existing rights, split estate lands). The objective of long-term restoration/reclamation is to make areas with disturbance useable by GRSG. For long-term restoration of priority habitat with discrete surface disturbances to be considered successful, GRSG must be documented to have used the area.	When considering implementation-level actions, the 5% disturbance calculation would include all discrete anthropogenic disturbances within a biologically based disturbance calculation area, which must be contained within the priority habitat of a GRSG population area. The disturbance calculation area would be identified during the site-specific project planning/NEPA phase, but the following would be taken into account when determining what would be included/excluded: • Developed agriculture lands should generally be excluded. • Areas of priority habitat that have burned but have not recovered to the extent of being able to provide habitat for GRSG should generally be excluded from the baseline disturbance calculation area for which the 5% is calculated (though the burned areas are still priority habitat), unless the proposed disturbance is within the burned area. (For example, a potential disturbance calculation area is 2,000 acres and does not have any existing disturbance, thereby allowing up to 100 acres of total disturbance. If 1,000 acres of the area burns, the calculation area should be adjusted to exclude the 1,000 burned acres, reducing potential disturbance in the remaining area to 50 acres. If the proposed disturbance is within the burned area, the calculation area should include the entire 2,000 acres, but the disturbance would still be limited to 50 acres.) • Developed private lands that are no longer used by GRSG (e.g., towns, airports, reservoirs) would be excluded. However, other dispersed disturbances would be considered disturbance (e.g., cabins, access roads, community pits, etc.). Discrete disturbances should be	restoration or other mitigation actions. Many of the State of Utah Sage-Grouse Management Areas extend into two or more counties. In such cases, the 5% limitation shall be apportioned to each county in proportion to the total amount of habitat within the larger area. Because of the highly discontinuous nature of GRSG habitat in Utah, each of the State of Utah Sage-Grouse Management Areas is a composite of habitat, non-habitat and opportunity areas. In many cases, it may be difficult to discern whether an existing dispersed use is part of habitat or non-habitat, and thereby make an accurate calculation of the base for the limitation calculation difficult to determine. As part of the implementation of this alternative, such issues should be brought to the interagency review effort coordinated by the PLPCO to insure consistency in interpretation throughout the state. In addition, if it should become sufficiently apparent that an accurate determination of the base for the limitation calculation is not feasible, then the interagency coordination effort may propose and seek approval for an alternative measurement of, or technique to measure, the cumulative effects of disturbance. The area of permanent disturbance is the area within a spatial polygon defined by the outside limits of the actual disturbed area, plus the area outside of this polygon where effects of the project, based on the type of project, could be expected to cause a disturbance to GRSG. Allowances must be made to include the temporal effects of any temporary disturbance, if any such effects are expected. The calculation of the spatial extent of each proposed project or land use, or the area of a

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			consolidated and localized as much as possible, though total areas with discrete disturbances cannot exceed 5% in the identified disturbance calculation area. This could result in small areas where existing and proposed disturbances exceed 5% if total disturbances in the identified disturbance calculation area equals or is less than 5%. Anthropogenic features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, homes, and mines. In priority habitats where the 5% disturbance threshold is already exceeded from any source, no further discrete anthropogenic disturbances will be permitted by the BLM or the Forest Service until enough habitat has been restored to maintain the area under this threshold (subject to valid existing rights). In these areas, reclaim and/or restore discrete anthropogenic disturbances, where technically and legally feasible, so that 5% or less of the disturbance calculation area is disturbed. Restoration/Reclamation of Surface Disturbances: An area with surface disturbance is not excluded from the 5% until it has been successfully reclaimed (short-term) and restored (long-term). The objective of long-term restoration/reclamation in priority habitat is to provide for the needs of GRSG. Providing habitat could include, but is not limited to restoring landforms and vegetative communities to reflect the potential for the given ecological site, as well as restoring hydrologic systems and other wildlife habitat components. To ensure that the long-term objective will be reached through human and natural processes, actions will be taken to	natural event, such as wildfire, to be employed in this calculation, is defined as part of the definition of disturbance. The base upon which this calculation is made may be increased through successful rehabilitation or restoration of habitat, or other mitigation actions as appropriate.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			ensure standards are met for soil site stability, hydrologic function, and integrity of the biotic communities. Specific restoration/reclamation objectives will be identified through the NEPA process, but for final restoration/reclamation to be judged successful within priority habitat, the following general objectives must be met: • Areas where the landform has been altered (e.g., well pads, production facilities, roads, pipelines, utility corridors, etc.) have been re-contoured to blend in with adjacent undisturbed areas, approximating the original landform. • A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community is established on the site, with a density sufficient to control erosion and invasive plants (e.g., cheatgrass, non-native thistles, knapweeds) and can reestablish wildlife habitat and/or forage production. At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species occurring in the surrounding natural vegetation. Permanent vegetative cover will be determined successful when the percent cover of desirable perennial species is consistent with GRSG habitat objectives and the ecological site description. Monitoring for restoration must extend for a reasonable time frame, generally for 5 years, but considering ecological site potential and environmental conditions (e.g., drought). At the end of the initial monitoring period, the ID team would determine if the site has potential for further restoration/reclamation beyond the 5 years, based on site potential and environmental conditions. Plants must be resilient as evidenced by well-	

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			developed root systems and flowers; shrubs must be well established and not comprised mainly of seedlings that may not survive until the following year. • Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gullying, headcutting, slumping, and deep or excessive rilling (greater than 3 inches) is not observed. • The site is free of State- or county-listed noxious weeds, anthropogenic debris and equipment, and contaminated soil. [Example of site-specific requirement: Given that cheatgrass is common in portions of the Project Area, it may not be possible to totally eliminate this invasive species from the reclaimed area.] • Final reclamation success and approval for final abandonment (for disturbances caused by permitted activities) will be subject to an interdisciplinary review of available monitoring data and final monitoring reports. An interdisciplinary team consisting of, at a minimum, a wildlife biologist, a rangeland management specialist, and another resource specialist (e.g., natural resources specialist) will evaluate the monitoring plan (from the NEPA or POD documents), and review the regular and final monitoring reports and provide the Authorized Officer with a recommendation as to whether or not objectives have been met. For non-permitted activities (e.g., reclamation of user created roads), successful restoration/reclamation occurs when the area meets the four criteria noted above, as determined by an interdisciplinary review of inventory/monitoring information.	
Most LUPs include a management action	No similar action.	No similar action.	Do not allow discrete anthropogenic	Within priority habitat in seasonal GRSG

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
that prohibits surface disturbing or other disruptive within GRSG breeding and nesting habitat within a certain distance and between certain dates. The protect buffers around leks vary from 0.5 miles and 3.1 miles. In general, recently completed plans include a larger protective buffer. Recently completed plans also include a management action that prohibits surface disturbing activity or disruptive activities during certain dates in winter habitat.			disturbances or activities disruptive to GRSG (including scheduled maintenance activities) within priority habitat in seasonal GRSG habitats during the corresponding seasonal use periods: • In breeding and nesting habitat from Feb 15 – Jun 15 • In brood rearing habitat from Apr 15 – Jul 15 • In winter habitat from Nov 15 – Mar15 In addition, the following use restrictions would be applied to discretionary activities within priority habitat, as applicable: • the activity meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • the activity meets permanent (structure persists through subsequent breeding season) tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); and • environmental compliance documents associated with the activity consider how to limit habitat fragmentation. Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager/Forest Supervisor under the following conditions: • if surveys determine that the lek is not active that year (based on DWR lek survey protocol), and the proposed activity will not take place beyond the	habitats during the corresponding seasonal use periods, avoid activities (construction, vehicle noise, etc.) that will disturb GRSG use of the seasonal area by employing seasonal stipulations as follows: • In leks (for lek attendance or breeding) from Feb 15 – May 15. • In nesting or brood-rearing areas from Apr 1 – Aug 15. • In winter habitat from Nov 15 – Mar 15. Specific time and distance determinations for all these seasonal stipulations would be based on site-specific conditions for all these seasonal stipulations, in coordination with the local UDWR biologist. In addition, the following management provisions would be applied to the applicable areas within priority GRSG habitat: Leks • Avoid disturbance within this area, if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance is not possible, use minimization as appropriate to the area. • If minimization is not sufficient, mitigation is required (see mitigation section below). • New permanent disturbance, including structures, fences, and buildings, should not be located within the lek itself. • No permanent disturbance within one mile of the lek, unless it is not visible to the sage-grouse using the lek. • Fences should not be located on or adjacent to leks where bird collisions would be expected to occur. If required, the construction

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			season being excepted; • if surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; • if the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated; • if the potential short-term impacts from the action are off-set by long-term improvement to the quantity or quality of habitat (e.g., seedings, juniper reduction). Additionally, the Field Manager/Forest Supervisor may modify the seasonal restrictions and use restrictions under the following conditions: • if portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the current defined area, as determined by the BLM/FS in discussion with the UDWR, and indirect impacts would be mitigated; • if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted.	of any fences near the lek should follow the standards identified in the NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication “Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes”). • A disturbance outside the lek should not produce noise which rises more than 10 db above the background level at the edge of the lek during breeding season. • Implement time-of-day stipulations during the season when the lek is occupied (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise). <u>Nesting and Brood-Rearing Areas</u> • Avoid disturbance within these areas, if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance is not possible, use minimization as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic features to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation to provide food and shelter). • If minimization is not sufficient, mitigation is required (see mitigation section below). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting habitat within the population area’s priority habitat. • Employ noise stipulations which allow no more than 10 db rise above ambient noise levels at the edge of the lek.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
				Winter Habitat • Avoid disturbance within the area, if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance is not possible, minimize as appropriate to the area. Minimization provisions include, for example, the location of development in habitat of least importance, of by locating development to take advantage of topographic screening. • If minimization is not sufficient, mitigation is required (see mitigation section below). • Cumulative new permanent disturbance should not exceed 5% of the surface area of winter habitat within the population area's priority habitat. • Manage the area to maintain maximum amount of sagebrush, especially tall sagebrush, which would be available to greater sage-grouse above snow during a severe winter. Tall sagebrush is capable of standing above heavier than normal snowfall. • Sagebrush treatment projects within this area need pre-approval by the appropriate regulatory agency in coordination with the DWR. Sagebrush treatment projects within winter habitat should maintain 80% of the available habitat as tall sagebrush; 20% of the habitat can be managed for younger age classes, if appropriate. Other Habitats • Avoid disturbance in the area if possible. Project proponents must demonstrate why avoidance is not possible.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
				- If avoidance is not possible, minimize as appropriate to the area. Minimization provisions include, for example, the location of development in habitat of least importance, or by locating development to take advantage of topographic screening. - If minimization is not sufficient, mitigation is required (see mitigation section below). - Mitigation must produce lands capable of supporting GRSG as habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the mitigation conditions have been met. - Cumulative new permanent disturbance should not exceed 5% of the surface area of other habitat within the population area's priority habitat. - Manage the lands to avoid barriers to migration, if applicable.
No similar action.	No similar action.	No similar action.	The BLM will allow other agencies to jointly manage predator populations within their various authorities, and will not take any predator population measures unilaterally. Apply standards for development activities within priority and general habitat to reduce opportunities for GRSG predators, such as limiting food sources (trash reduction), nesting, cover, or perches. Apply actions specific to the predators of concern for the given GRSG population (e.g., ravens, red fox, badgers, raccoons, raptors).	Predation control and management should be managed by Wildlife Services, Department of Agriculture and Food, in coordination with the Division of Wildlife Resources. Eliminate or minimize external food sources for corvids, particularly dumps, waste transfer facilities, and road kill. Apply habitat management practices (e.g. grazing management, vegetation treatments) that decrease the effectiveness of predators.
Under current management plans, there is no designated general habitat.	Conserve, enhance or restore sage-grouse general habitat and connectivity to promote movement and genetic diversity, with emphasis on those habitats occupied by	No similar action.	Conserve GRSG general habitat to maintain existing habitat and maintain connectivity between populations, or if necessary, to provide for opportunities to improve priority	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	GRSG.		habitat and opportunity areas. Do not allow discrete anthropogenic disturbances or activities disruptive to GRSG (including scheduled maintenance activities) within general habitat in seasonal GRSG habitats during the corresponding seasonal use periods: • In breeding and nesting habitat from Feb 15 – Jun 15 • In brood rearing habitat from Apr 15 – Jul 15 • In winter habitat from Nov 15 – Mar15 In addition, the following use restrictions will be applied to discretionary activities within general habitat, as applicable: • the activity meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • the activity meets permanent (structure persists through subsequent breeding season) tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); and • environmental compliance documents associated with the activity consider how to limit habitat fragmentation. Exceptions to the seasonal restrictions and use restrictions could be granted Field Manager/Forest Supervisor under the following conditions: • if surveys determine that the lek is not	

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			active that year (based on DWR lek survey protocol), and the proposed activity will not take place beyond the season being excepted; • if surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; • if the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated; • if the potential short-term impacts from the action are off-set by long-term improvement to the quantity or quality of habitat (e.g., seedings, juniper reduction). Additionally, the Field Manager/Forest Supervisor may modify the seasonal restrictions and use restrictions under the following conditions: • if portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the current defined area, as determined by the BLM/FS in discussion with the UDWR, and indirect impacts would be mitigated; • if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. Application of the above use restrictions and meeting objectives within general habitat may be waived by the Field Manager/Forest Supervisor if off-site mitigation is successfully completed in priority habitat or opportunity	

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			areas, following discussion with BLM/FS and UDWR. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.	
No opportunity areas identified in current management plans. Most LUPs contain objectives for maintaining improving, or restoring sagebrush plant communities. The level of detail varies depending on the age of the land use plan. All LUPs address vegetation treatments for improvement of wildlife habitat overall or to provide increased forage for wildlife, livestock, and wild horses and burros. Recent plans may include management actions that purposely restore or enhance sage-grouse habitat.	Assess general sage-grouse habitats to determine potential to replace lost priority habitat caused by perturbations and/or disturbances and provide connectivity between priority areas. • These habitats should be given some priority over other general GRSG habitats that provide marginal or substandard GRSG habitat. • Restore historical habitat functionality to support GRSG populations guided by objectives to maintain or enhance connectivity. • Enhance general GRSG habitat such that population declines in one area are replaced elsewhere within the habitat.	Identify GRSG restoration habitat and prioritize areas for implementation of restoration projects based on environmental variables that improve chances for project success. Restoration habitat is degraded or fragmented habitat that is currently unoccupied by GRSG, but might be useful to the species if restored to its potential natural community. Prioritize areas for restoration based on their potential importance to GRSG and the likelihood of successfully restoring sagebrush communities. Passive restoration is preferred for restoring these areas over active restoration methods.	Opportunity areas are areas adjacent to priority habitat that currently do not contribute to the life cycle of GRSG but that offer the best potential for creating additional habitat through restoration or rehabilitation. These areas will be delineated at the Field Office level, in discussion with the UDWR, to account for regional variation. Land uses (e.g. minerals, OHV use, realty) within opportunity areas will be managed in such a manner as to maintain and improve habitat conditions. When assessing authorization of actions in opportunity areas, consider and analyze measures that would reduce or eliminate direct, indirect, and cumulative effects from infrastructure or development. Manage opportunity areas so as not to preclude future mitigation options. Additional management and vegetation treatments may also be applied to opportunity areas to maintain their potential to meet GRSG habitat objectives and provide additional GRSG habitat. Discrete anthropogenic disturbances should not be authorized in areas that have been previously treated with the intent of improving or creating new GRSG habitat. Off-site mitigation for actions or authorizations within general habitat could occur in these areas. When and if opportunity areas reach the landscape sagebrush cover objectives for priority habitat and monitoring shows that GRSG are using the site, they will be added to priority habitat, in discussion with UDWR. Identify opportunity areas to determine where	Opportunity areas are those portions of a State of Utah Sage-Grouse Management Areas that currently do not contribute to the life cycle of sage-grouse but are areas where restoration or rehabilitation efforts can provide additional habitat when linked to existing sage-grouse populations. Opportunity areas may be transformed into either habitat or non-habitat based upon natural events or management choices, and may be used to mitigate disturbance within habitat as appropriate. Opportunity areas may be employed to meet improvement, restoration or rehabilitation goals, or as mitigation areas for disturbance within habitat. If this occurs, an opportunity area may become habitat and be managed as such, especially as part of the calculation for disturbance limitations. Alternatively, opportunity areas may be employed as the site for disturbances which are diverted from habitat, or other economic proposals not involving habitat, and therefore become non-habitat. In either event, boundaries of the priority habitat, or the land types within, should be adjusted accordingly.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			habitat could be restored and/or to provide connectivity between priority areas. Where ecologically applicable, restore historical habitat functionality to support GRSG populations guided by objectives to maintain or enhance connectivity.	
No similar action.	No similar action.	No similar action.	The use restrictions, stipulations, seasonal constraints, etc. included for GRSG habitat are intended to be the initial and not the entirety of the protections. Project proponents and BLM/FS offices should develop additional mitigation measures at the project level to address the site-specific issues and impacts associated with local effects of specific projects. The mitigation actions developed at the project level must be based on current scientific recommendations. Mitigation actions could include some or all of the following: • avoiding the impact altogether by not taking a certain action or parts of an action, • minimizing impacts by limiting the degree of magnitude of the action and its implementation, • repairing, rehabilitation, or restoring the affected area, • reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, or • compensating for the impact by replacing or providing substitute resources or environments. While beneficial to the understanding of the species, money for research or monitoring is not mitigation for impacts to habitat, as it does not offset the impacts to the birds. Mitigation includes actions that are designed to create new habitat or ameliorate disturbances by the creation of or protection of other habitat, either within the same	Mitigation actions are designed to create new habitat or ameliorate disturbances by the creation of or protection of other habitat. Mitigation for a disturbance must be shown to be effective in the time-frame of the activity, not at some future date. Effective mitigation does not require that birds are immediately present using the land, only that the habitat is capable of supporting birds as part of their yearly life-cycle. However mitigation should be performed in areas which have the highest likelihood of occupation by the species. The amount of mitigation, if required, should be calculated based on the effects generated within priority habitat inside a population area. Prioritize areas for habitat improvement to make best use of mitigation funds. Mitigation for a disturbance should not necessarily be tied to reclamation efforts at the actual site of the disturbance. Mitigation may occur locally, elsewhere in the same population area, or in another population area, based on the location, which offers greater potential for enhancing GRSG populations, so long as the location of the mitigation does not result in the loss of resiliency, representation or redundancy of the species in Utah. The Public Lands Policy Coordination Office, with assistance from the Division of Wildlife Resources, Bureau of Land Management, Forest Service, Natural Resources Conservation Service, Department of Natural Resources, Department of Agriculture and Food, and other entities, shall coordinate and oversee the creation and operation of a Greater

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			population or in other areas of the State. The preference is that mitigation for impacts within priority habitat will occur within the same population area of the impact. For off-site mitigation associated with mitigation of actions within general habitat, project proponents will work closely with the BLM and DWR to identify priority habitat or opportunity areas where off-site mitigation could occur. The ratio for mitigation, either onsite or off-site, will be set at the project level and will depend on the type and quality of the habitat being affected and the nature of the action affecting the habitat. While mitigative exchange values will not be set in this planning process, they need to follow the guiding principles of not trading short-term gains for long-term losses. For compensatory mitigation (either onsite or off-site), actions should consider the type and quality of habitat being impacted by a project and the proportional impact a project will have the population. In turn, proposed mitigation actions should address the same type and quality of habitat that may be impacted (e.g., breeding, nesting, brood-rearing, wintering, transitional habitats). The value of the habitat may increase if the birds use the area for more than one time of the year, if it is relatively higher in quality, or if the type of habitat is a limiting factor for the local population. Similarly, mitigation should account for the proportional impact a project will have to a specific population (if a given project impacts 1% of wintering habitat versus 30% of the wintering habitat). Mitigation that trades impacts to areas that are meeting habitat objectives with creation of areas that do not meet habitat objectives, even in high offsetting ratios, will not be accepted. Mitigation does not require that birds are immediately present using the land, only that the habitat meets habitat objectives	Sage-Grouse Mitigation Bank in Utah. The operation of this Mitigation Bank will seek to rehabilitate or restore lands as habitat prior to need, as well as coordinate the mitigation for development or other effects upon the habitat of the GRSG. Once operational, contributions to the Bank will be welcome. Mitigation may be required in nesting and brood-rearing areas, winter habitat, and other priority habitat. Examples of successful mitigation for various GRSG habitat types include the following: Leks • Removal of trees on or adjacent to the lek. • Removal or marking of fences on or adjacent to the lek. • Employment of off-site mitigation (e.g., use of the concept of a mitigation bank, if appropriate). Nesting and Brood-Rearing Areas • Removal of trees to no more than 5% cover (the close to 0% the better) and maintenance of at least 10% sagebrush cover. • Maintain forb cover greater than 10% and greater than 10% grass cover during nesting and brood-rearing season. • Maintain or improve wet meadows, when present. • Installation of green-strips or firebreaks to protect existing nesting habitat. • Employment of off-site mitigation (e.g., use of the concept of a mitigation bank, if appropriate). • Mitigation should be calculated at a minimum of a 4:1 ratio starting with the first acre disturbed. Winter Habitat • Removal of trees to less than 5% cover (the closer to 0% the better) and maintenance of at least 10% sagebrush

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			for grasses and forbs. However mitigation should be performed in areas which have the highest likelihood of occupation by the species.	cover. • Installation of green-strips or firebreaks to protect existing winter habitat. • Employment of off-site mitigation (e.g., use of the concept of a mitigation bank, if appropriate). • Mitigation should be calculated at a 4:1 ratio starting with the first acre disturbed. <u>Other Habitats</u> • Removal of trees to less than 5% cover and maintenance of at least 10% sage brush cover. • Maintain forb cover greater than 10% and grass cover greater than 10% during nesting/brood-rearing season. • Maintain or improve wet meadows, when present. • Installation of green-strips or firebreaks to protect existing habitat. • Employment of off-site mitigation (e.g., use of the concept of a mitigation bank, if appropriate). • Mitigation should be calculated at a 1:1 ratio with first acre disturbed. Mitigation must produce lands capable of supporting GRSG habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the conditions have been met. Before mitigated areas are considered to be habitat within a priority habitat area, a preponderance of the evidence must indicate that GRSG are occupying the mitigated area. Habitat altered by fire shall not be removed from priority habitat until rehabilitation or restoration of the burned areas is determined to be unsuccessful or not feasible.
Lands and Realty				
Manage ROWs in GRSG habitat as follows:	Manage ROWs in GRSG habitat as follows:	Manage ROWs in GRSG habitat as follows:	Manage ROWs in GRSG habitat as follows:	Manage ROWs in GRSG habitat as follows:

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
- Open to new ROWs: 3,219,000 acres - New ROWs Avoided: 67,200 acres - New ROWs Excluded: 27,600 acres Manage ROWs outside of GRSG habitat but in population areas as follows: - Open to new ROWs: 2,344,400 acres - New ROWs Avoided: 50,800 acres - New ROWs Excluded: 74,900 acres	- Open to new ROWs: 529,600 acres - New ROWs Avoided: 0 acres - New ROWs Excluded: 2,784,200 acres Manage ROWs outside of GRSG habitat but in population areas the same as Alternative A.	- Open to new ROWs: 0 acres - New ROWs Avoided: 0 acres - New ROWs Excluded: 3,313,800 acres Manage ROWs outside of GRSG habitat but in population areas the same as Alternative A.	Above-Ground Linear ROWs - Open – 522,600 acres - Avoided – 1,368,900 acres - Excluded – 1,422,300 acres Underground/Surface Linear ROWs - Open – 532,000 acres - Avoided – 2,754,200 acres - Excluded – 27,600 acres Above-Ground Site-Type ROWs (non-wind or solar) - Open – 531,900 acres - Avoided – 2,562,000 acres - Excluded – 219,900 acres Manage ROWs outside of GRSG habitat but in population areas as follows: Above-Ground Linear ROWs - Open – 1,925,900 acres - Avoided – 462,500 acres - Excluded – 81,700 acres Underground/Surface Linear ROWs - Open – 2,337,000 acres - Avoided – 58,200 acres - Excluded – 74,900 acres Above-Ground Site-Type ROWs (non-wind or solar) - Open – 2,337,100 acres - Avoided – 51,700 acres - Excluded – 81,300 acres	- Open to new ROWs: 632,200 acres - New ROWs Avoided: 2,654,000 acres - New ROWs Excluded: 27,600 acres Manage ROWs outside of GRSG habitat but in population areas as follows: - Open to new ROWs: 2,292,000 acres - New ROWs Avoided: 103,200 acres - New ROWs Excluded: 74,900 acres
No similar action.	All ROWs in Priority Habitat Make priority sage-grouse habitat areas exclusion areas for new ROWs permits.	All ROWs in Priority Habitat Occupied sage-grouse habitat areas shall be exclusion areas for new ROWs permits.	Above-Ground Linear ROWs (e.g., transmission lines, distribution lines, telephone lines): Priority habitat within 4 miles of an occupied lek, if the lek is located within priority habitat, would be designated as an exclusion area for new above-ground linear ROWs. Priority habitat beyond 4 miles of an	All ROWs in Priority Habitat Management stipulations and conditions should focus on mitigating direct disturbance during construction. Should new research demonstrate indirect impacts to greater sage-grouse production, additional mitigation measures may be required. Priority habitat would be designated as an

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			occupied lek, if the lek is located within priority habitat, would be designated as an avoidance area for new above-ground linear ROWs. Development within the avoidance areas could occur if: • the GRSG population trend within the disturbance calculation area is stable; • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); • the development does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); and • the development does not exceed the 5% disturbance limit. Areas within 1 mile of an occupied lek, if the lek is located within priority habitat, whether the area is in occupied or unoccupied GRSG habitat, would be designated as an exclusion area for new above-ground linear ROWs. Areas outside priority habitat and within 4 miles of an occupied lek, if the lek is located within priority habitat, would be designated as an avoidance area for new ROWs. Development within the avoidance areas could occur if: • the GRSG population trend within the disturbance calculation area is stable;	avoidance area for new ROWs. Apply stipulations as follows, as well as best management practices accepted by industry and state and federal agencies: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat, if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			• the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); and • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography). Above-Ground Site-Type ROWs (not wind/solar) (e.g., communication towers, cell towers): Areas within 1 mile of an occupied lek that is located within priority habitat, whether the area is in occupied or unoccupied GRSG habitat, would be designated as an exclusion area for new above-ground site-type ROWs (excluding wind or solar). Priority habitat beyond 1 mile of an occupied lek, if the lek is located within priority habitat, would be designated as an avoidance area for new above-ground site-type ROWs. Development within the avoidance areas could occur if: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by	least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable. Engage in reclamation efforts as projects are completed. Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim disturbed areas, and remove those barriers in order to achieve immediate and effective reclamation, if otherwise allowable by law.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); • the development does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); and • the development does not exceed the 5% disturbance limit. Exceptions to the avoidance area could be granted by the Field Manager/Forest Supervisor if the new ROW were constructed entirely within the footprint of an existing site-type ROW, if the new development meets noise restrictions, and if the development does not occur during sensitive seasonal periods. Underground/On-Ground ROWs (e.g., buried and surface pipelines, roads) Priority habitat would be designated as an avoidance area for new permanent underground and on-ground linear ROWs. Development within the avoidance areas could occur if: • the GRSG population trend within the disturbance calculation area is stable; • the long-term development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • there are no above ground structures or operational facilities associated with the ROW; • the construction of the development does not occur during sensitive seasonal periods (i.e., breeding and	

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			nesting, brood rearing, winter); and • the surface disturbance from the development does not exceed the 5% disturbance limit.	
No similar action.	Consider the following exceptions: • Within designated ROW corridors encumbered by existing ROW authorizations: new ROWs may be co-located only if the entire footprint of the proposed project (including construction and staging), can be completed within the existing disturbance associated with the authorized ROWs. • Subject to valid, existing rights: where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3% for that area, then make additional effective mitigation necessary to offset the resulting loss of GRSG.	Consider the following exceptions: • Subject to valid, existing rights: where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3% for that area, then make additional mitigation that has been demonstrated to be effective to offset the resulting loss of sage-grouse habitat.	The BLM may grant new FLPMA Title 5 ROWs for existing roads within GRSG priority habitat so long as the road would remain in the existing condition and same physical location (as is, where is), unless a realignment would benefit GRSG. Seasonal restrictions (breeding and nesting, brood rearing, winter) would be placed on maintenance of new Title 5 ROWs to minimize disruption of GRSG, subject to the exceptions noted in the SSS section. New above-ground linear ROWs within exclusion areas in priority habitat are limited to location in designated corridors. Where new ROWs associated with valid existing rights are required within priority habitat, co-locate new ROWs as close as technically possible to existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments as described above, to access valid existing rights within priority habitat that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 5% for that area, then make additional effective mitigation necessary to offset the resulting loss of GRSG.	For electrical transmission lines, and where feasible and consistent with federally required electrical separation standards, site new linear transmission features in existing corridors, or at a minimum, in concert with existing linear features in GRSG habitat. Siting linear features accordingly shall be deemed to be mitigation for the siting of that linear feature. Mitigation for the direct effects of construction is still required.
Designate ROW corridors within GRSG habitat as identified on Map 2.X (177,700 acres)	Designate ROW corridors within GRSG priority habitat as identified on Map 2.X (130,200 acres). Undesignate ROW corridors that currently do not have any ROWs authorized in them (47,500 acres).	Undesignate all designated ROW corridors within GRSG occupied habitat as identified on Map 2.X. New ROWs are excluded from GRSG occupied habitat.	Designate ROW corridors within GRSG priority habitat as identified on Map 2.X: • Retain 89,400 acres of existing designated ROW corridor • Retain 48,400 acres of existing designated ROW corridor, but stipulate new developments be limited to	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			subsurface use only - Undesignate 39,700 acres of existing designated ROW corridor - Designate 31,700 acres as new designated ROW corridor While new ROWs can be developed within designated ROW corridors, the preference is to avoid GRSG habitat altogether. If this is not possible, development will be limited to the designated corridors. New designated corridors within priority habitat will not exceed 3,500 feet in width. New above-ground ROWs within designated corridors will be constructed as close as technically feasible to existing above-ground lines to limit disturbance to the smallest footprint.	
No similar action.	Evaluate and take advantage of opportunities, to remove, bury, or modify existing power lines within priority sage-grouse habitat areas.	Same as Alternative B.	During renewal, amendment, or reauthorization of existing permits, evaluate and where appropriate, work with existing ROW holders to modify existing power lines within priority sage-grouse habitat areas to mitigate impacts of existing powerlines, taking into account the potential impacts of the mitigation (relocation, burying, etc.) with the existing impacts of the line.	No similar action.
All LUPs include management actions that require reclamation/restoration of disturbed areas that are no longer used in support of authorized actions.	Where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat.	Same as Alternative B.	Same as Alternative B.	No similar action.
<u>No similar action.</u>	<u>All ROWs</u>: Make general sage-grouse habitat areas “avoidance areas” for new ROWs.	No similar action.	<u>All ROWs</u>: General habitat within 1 mile of an occupied lek, if the lek is located within general habitat, would be designated as an avoidance area for new ROWs. Development within the avoidance areas could occur if: - the development (during construction and after) meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			two hours after sunrise and sunset during breeding season); • the structures remaining after development meet tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); and • the development does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter). General habitat within and beyond the 1.0 mile avoidance area would require discussion with UDWR during project implementation, and implementation of best management practices (e.g., anti-perch devices for raptors, etc.). The avoidance area could be waived, except for the seasonal restrictions, if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority habitat or opportunity areas.	
Most LUPs include a management action that encourages placement of new ROWs in designated utility corridors and/or co-location of new ROWs adjacent to existing ROWs.	Where new ROWs are necessary in general habitat, co-locate new ROWs within existing ROWs where possible.	No similar action.	Same as Alternative B.	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.
Land Tenure: Make approximately 24,400 acres of land within in sage grouse habitat available for FLPMA Section 203 sale (Figure X.X). In order to be considered for any form of land tenure adjustment, all lands not specifically identified for disposal must meet criteria included in FLPMA and in each LUP.	Land Tenure: Retain public ownership of priority GRSG habitat. Consider exceptions where there is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the priority GRSG habitat area. Under priority GRSG habitat areas with minority federal ownership, include an	Land Tenure: Same as Alternative B, without exceptions for disposal to consolidate ownership that would be beneficial to GRSG. No BLM or FS lands within occupied habitat would be available for land tenure adjustments.	Land Tenure: Same as Alternative B, so long as potential land exchanges benefit GRSG, and do not negatively impact other federally listed threatened or endangered species. Approximately 5,540 acres of general habitat would still be available for disposal through FLMPA Section 203 sale (Figure X.X).	Land Tenure: No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure consideration should be given to pursuing a permanent conservation easement. Approximately 5,490 acres of general habitat would still be available for disposal through FLMPA Section 203 sale (Figure X.X).			
Most LUPs include a management action that allows for acquisition of lands that have important resource values including crucial wildlife habitat and land tenure adjustments to improve the manageability of public lands.	Where suitable conservation actions cannot be achieved in priority habitat, seek to acquire state and private lands with intact federal mineral estate by donation, purchase or exchange in order to best conserve, enhance or restore sage-grouse habitat.	Same as Alternative B.	Same as Alternative B.	No similar action.
Withdrawal: Propose approximately 498,700 acres of federal lands and non-federal lands with federal mineral interests within GRSG habitat for mineral withdrawal.	Withdrawal: Propose federal lands and non-federal lands with federal mineral interests within priority GRSG habitat areas for mineral withdrawal (3,650,900 acres of new proposed withdrawals).	Withdrawal: Propose federal lands and non-federal lands with federal mineral interests within occupied GRSG habitat for mineral withdrawal (4,008,580 acres).	Withdrawal: Do not propose additional federal lands or non-federal lands with federal mineral interests within priority or general GRSG habitat for locatable mineral withdrawal.	Withdrawal: Do not propose additional federal lands or non-federal lands with federal mineral interests within priority or general GRSG habitat for locatable mineral withdrawal.
No similar action.	In priority habitat, do not recommend withdrawal proposals not associated with mineral activity unless the land management is consistent with GRSG conservation measures. (For example; in a proposed withdrawal for a military training range buffer area, manage the buffer area with GRSG conservation measures.)	Do not approve withdrawal proposals not associated with mineral activity unless the land management is consistent with sage-grouse conservation measures. (For example, in a proposed withdrawal for a military training range buffer area, manage the buffer area with sage-grouse conservation measures that have been demonstrated to be effective, or according to the joint BLM-DOD management.)	No similar action.	No similar action.
Wind Energy Development				
Evaluate wind energy development on a case-by-case basis, subject to other ROW management decisions. Manage ROWs in GRSG habitat as follows: • Open to new ROWs: 3,219,000 acres • New ROWs Avoided: 67,200 acres • New ROWs Excluded: 27,600 acres Manage ROWs outside of GRSG habitat but in population areas as follows: • Open to new ROWs: 2,344,400 acres	Make priority GRSG habitat areas exclusion areas for new leases or ROWs permits (2,781,700 acres).	Do not site wind energy development in occupied GRSG habitat (3,313,800 acres).	Priority habitat would be designated as exclusion areas for wind energy development (2,760,300 acres). Manage wind energy development in GRSG habitat as follows: • Open – 522,500 acres • Avoided – 9,400 acres • Excluded – 2,781,900 acres Manage wind energy development outside of GRSG habitat but in population areas as	Priority habitat would be available for wind energy development, though it would be designated as an avoidance area for wind energy development. Manage wind energy development in GRSG habitat as follows: • Open to new ROWs: 632,200 acres • New ROWs Avoided: 2,654,000 acres • New ROWs Excluded: 27,600 acres Manage wind energy development outside of

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
• New ROWs Avoided: 50,800 acres • New ROWs Excluded: 74,900 acres			follows: • Open – 1,925,200 acres • Avoided – 462,500 acres • Excluded – 82,400 acres Areas outside priority habitat and within 4 miles of an occupied lek located within priority habitat would be designated as an avoidance area for wind energy development. Development within the avoidance areas can occur if: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); and • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); Exclude wind energy development within 1.0 mile (including priority, general, or non-habitat areas) of occupied leks located in either priority or general habitat. The exclusion could be waived outside of priority habitat if applicable seasonal restrictions are implemented (breeding and nesting, brood rearing, winter) and if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority or opportunity habitat. Development within general habitat beyond the 1.0 mile exclusion area would require	GRSG habitat but in population areas as follows: • Open to new ROWs: 2,292,000 acres • New ROWs Avoided: 103,200 acres • New ROWs Excluded: 74,900 acres Apply stipulations as follows, as well as best management practices accepted by industry and state and federal agencies: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat, if possible. Project proponents must demonstrate why avoidance is not

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			discussion with UDWR during project implementation, and implementation of best management practices, including potential off-site mitigation in priority habitat or opportunity areas.	possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable. Engage in reclamation efforts as projects are completed. Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim disturbed areas, and remove those barriers in order to achieve immediate and effective reclamation, if otherwise allowable by law.
	No similar action.	Site wind energy development at least five miles from occupied GRSG leks.	No similar action.	No similar action.
Solar Energy Development (Utility Scale)				
Make priority sage-grouse habitat areas exclusion areas for new utility scale solar development.	Make priority sage-grouse habitat areas exclusion areas for new leases or ROWs permits (2,781,700 acres).	Industrial solar projects will be prohibited in ACECs and occupied habitats (3,313,800 acres).	Priority habitat would be designated as exclusion areas for solar energy development (2,760,300 acres). Manage solar energy development in GRSG habitat as follows: • Open – 522,500 acres • Avoided – 9,400 acres • Excluded – 2,781,900 acres Manage solar energy development outside of GRSG habitat but in population areas as follows:	Priority habitat would be available for solar energy development, though it would be designated as an avoidance area for solar energy development. Manage solar energy development in GRSG habitat as follows: • Open to new ROWs: 632,200 acres • New ROWs Avoided: 2,654,000 acres • New ROWs Excluded: 27,600 acres Manage solar energy development outside of GRSG habitat but in population areas as

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			• Open – 1,925,200 acres • Avoided – 462,500 acres • Excluded – 82,400 acres Areas outside priority habitat and within 4 miles of an occupied lek located within priority habitat, excluding designated solar energy zones, would be designated as an avoidance area for solar energy development. Development within the avoidance areas can occur if: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); and • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); Exclude solar energy development within 1.0 mile (including priority, general, or non-habitat areas) of occupied leks located in either priority or general habitat. The exclusion could be waived outside of priority habitat if applicable seasonal restrictions are implemented (breeding and nesting, brood rearing, winter) and if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority or opportunity habitat. Development within general habitat beyond the 1.0 mile exclusion area would require	follows: • Open to new ROWs: 2,292,000 acres • New ROWs Avoided: 103,200 acres • New ROWs Excluded: 74,900 acres Apply stipulations as follows, as well as best management practices accepted by industry and state and federal agencies: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat, if possible. Project proponents must demonstrate why avoidance is not possible.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			discussion with UDWR during project implementation, and implementation of best management practices, including potential off-site mitigation in priority habitat or opportunity areas.	• If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable. Engage in reclamation efforts as projects are completed. Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim disturbed areas, and remove those barriers in order to achieve immediate and effective reclamation, if otherwise allowable by law.
Habitat Restoration/Vegetation Management				
In most LUPs, either no priorities are established or prioritization is given to projects that benefit multiple resources (e.g., livestock, wildlife, wild horses and burros, special status species).	Prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. Prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution and/or abundance.	Prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. Prioritize restoration in seasonal habitats that are thought to be limiting sage-grouse distribution and/or abundance and where factors causing degradation have already been addressed.	Where necessary to meet habitat objectives, treat GRSG priority habitat and opportunity areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas, areas with or at threat to be converted to annual grasslands, areas without a proper shrub/grass/forb composition for the applicable seasonal habitat and ecological site, fuel breaks, areas without a healthy mosaic of habitat types for the various GRSG life stages). Prioritize implementation of restoration/treatment projects based on environmental variables that improve	Protection of GRSG habitat is the primary focus of conservation efforts, but many locations can be reclaimed or restored by active vegetation management actions. For example: • removal of encroaching conifers may create new habitat or increase the carrying capacity of habitat and thereby expand grouse populations, or • the distribution of water into wet meadow areas may improve seasonal brood-rearing range and enhance greater sage-grouse recruitment. Aggressively remove encroaching conifers

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			chances for project success in areas most likely to benefit GRSG. Prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance. Use cooperative planning efforts to develop and implement habitat restoration projects. Expertise and ideas from entities such as local landowners, local GRSG working groups, and other federal, state, county, and private organizations should be solicited and considered in development of projects. Consider design features that will contribute to the most favorable conditions for success when planning and implementing restoration/vegetation treatment projects. Considerations should include: • Review of available plant species and their adaptation to the site when developing seed mixes. • The need to reduce non-native annual grass densities and competition through herbicide, targeted grazing, tillage, prescribed fire, etc. • Assessment of on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider the use of passive restoration techniques. • Use of site preparation techniques that retain existing desirable vegetation. • Use of "mother plant" techniques or planting of satellite populations of desirable plants to serve as seed sources. • The need for post-treatment control of non-native annual grass and other invasive species.	and other plant species to expand GRSG habitat where possible. Sagebrush treatment projects within nesting and winter habitat should be limited and require pre-approval by the appropriate regulatory agency in discussions with DWR. Sagebrush treatment projects should maintain 80% of the available habitat as sagebrush within the project area; 20% of the habitat can be managed for younger age classes of sagebrush, if appropriate. These treatments are generally recommended only to improve brood-rearing habitat, but need to be carefully considered before use in winter and other habitat. Within priority habitat, GRSG stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law. Design water developments to enhance mesic habitat for use by greater sage-grouse and maintain adequate vegetation in wet meadows. Within SGMAs, greater sage-grouse stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.
Most LUPs contain objectives for maintaining improving, or restoring sagebrush plant communities. The level of detail varies depending on the age of the land use plan.	Include GRSG habitat parameters as defined by Connelly et al. (2000), Hagen et al. (2007) or if available, State GRSG Conservation plans and appropriate local information in	Include sage-grouse habitat objectives in habitat restoration projects. Make meeting these objectives within occupied sage-grouse habitat the highest restoration priority.	Include GRSG habitat objectives in restoration/treatment projects within priority habitat and opportunity areas. There will be objectives for short-term and long-term	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
All LUPs address vegetation treatments for improvement of wildlife habitat overall or to provide increased forage for wildlife, livestock, and wild horses and burros. Recently completed BLM plans include a management action to implement the most recent *UDWR Strategic Management Plan for Sage-Grouse* (UDWR, 2000), the *BLM National Sage Grouse Habitat Conservation Strategy* (BLM, 2004). A few plans (e.g., Vernal RMP, Uinta LRMP) including more detailed habitat objectives such as desired seral sage, percent canopy cover, or height.	habitat restoration objectives. Make meeting these objectives within priority GRSG habitat areas the highest restoration priority.		habitat conditions, and they should include specific objectives for the establishment of sagebrush cover and height, as well as cover and heights for understory perennial grasses and forbs necessary for GRSG seasonal habitats. The restoration/treatment objectives should take into consideration ecological site potential of the area(s) and the need for a mosaic of habitat conditions across the landscape. Make meeting the GRSG objectives for the restoration/treatment project one of the primary priorities for the project and subsequent land uses, recognizing that managing for other special status species may result in treatment objectives that may not meet GRSG seasonal habitat objectives (e.g., winter habitat cover requirements vs. creation of Utah prairie dog habitat). Where GRSG habitat overlaps with that of federally listed threatened or endangered species (e.g., Utah prairie dogs), assemble species-specific experts to develop conservation and recovery objectives and allow habitat treatments that will benefit both species.	
All recent LUPs include management actions that promote use of native species where possible. Older plans typically do not include a similar management action.	Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, non-native seeds may be used as long as they support GRSG habitat objectives.	Same as Alternative B.	Prioritize the use of native seeds for restoration in priority GRSG habitat and opportunity areas based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, non-native seeds may be used as long as they support GRSG habitat objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the principle objective for rehabilitation efforts.	No similar action.
All LUPs, which are written in accordance with applicable program direction, include management actions that allow the administrating agency to make adjustments to livestock grazing, wild horse and burro management, and travel management on a case-by case basis following restoration	Design post restoration management to ensure long term persistence. This could include changes in livestock grazing management, wild horse and burro management and travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG.	Same as Alternative B.	Same as Alternative B.	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
activities.				
Allow commercial seed collection on a case-by-case basis.	No similar action.	No similar action.	Identify areas where commercial seed or live plant collection in GRSG priority habitat could occur. Limit collection to levels that ensure long-term maintenance of the GRSG habitat objectives. Locations, species allowed for collection, and limits on the amounts to be collected will be developed on a case-by-case basis following environmental review of annual site-specific conditions. Collection during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter) will include mitigation, developed to reflect the site-specific conditions on the ground, that could include, but is not necessarily limited to, restrictions on the timing and method of collection activities, limiting the number of individuals collecting, providing portions of collected seeds for use in local restoration projects, etc.	No similar action.
Most LUPs do not include a similar action. A few plans include management actions that encourage use of native species from local sources when possible.	Consider potential changes in climate when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species.	Same as Alternative B.	Allow for seed collection and use in restoration/reclamation activities. Prioritize use of seed from areas as close as possible to where the seed will be used to capture local adaptations.	No similar action.
No similar action. Most LUPs do not include specific management actions related to seedings. Plans do include generic decisions that allow maintenance of existing range improvements, which includes maintenance of historical seedings. Recently completed LUPs promote use of native species when conducting restoration activities. This would include restoration projects conducted in areas that have perennial grass cover. Older plans do not include a similar management action.	Restore native (or desirable) plants and create landscape patterns which most benefit GRSG.	Exotic seedings will be rehabbed, interseeded, or restored to recover sagebrush in areas to expand occupied habitats. Complete active restoration of crested wheatgrass seedings. This can be accomplished, following targeted restoration planning to expand, reconnect or recover habitats required by GRSG by: • Inter-seeding sagebrush seed or seedlings. • Removal of crested wheatgrass through plowing while minimizing use of herbicides. Subsequent re-seeding with local native ecotypes. In all cases, local native plant ecotype seeds	Diversify the perennial grass and forb components through additional seeding in areas where monotypic stands resulting from historical seedings have been recolonized by sagebrush	Aggressively remove cheatgrass and other invasive species, and rehabilitate areas to provide additional habitat for GRSG where possible.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
		and seedlings must be used. Perform active restoration of cheatgrass infestation areas.		
Most LUPs contain objectives for maintaining improving, or restoring sagebrush plant communities. The level of detail varies depending on the age of the land use plan. All LUPs address vegetation treatments for improvement of wildlife habitat overall or to provide increased forage for wildlife, livestock, and wild horses and burros. Recent LUPs may include management actions that purposely restore or enhance sage-grouse habitat.	Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) the highest priority for restoration efforts.	Composition, function, and structure of native vegetation communities will meet ecological site description (ESD) (or the Forest Service equivalent) and will provide for healthy, resilient, and recovering GRSG habitat components.	Desired cover percentages and heights for sagebrush, grasses, and forbs in seasonal habitats will follow habitat guidelines from scientific literature (e.g., Connelly et al. 2000, Hagen et al. 2007). Adjustments from the guidelines may be made, but must be based on documented regional variation of habitat characteristics (e.g., sagebrush type, ecological site potential), quantitative data from population and habitat monitoring, and evaluation of local research.	No similar action.
No similar action.	In fire prone areas where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances.	Same as Alternative B.	No similar action.	No similar action.
No similar action.	No similar action.	Avoid sagebrush reduction/treatments to increase livestock or big game forage in occupied habitat and include plans to restore high-quality habitat in areas with invasive species.	No similar action.	No similar action.
Integrated Invasive Species Management				
Implement noxious weed and invasive species control using integrated weed management actions per national guidance and local weed management plans in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners.	Integrated Vegetation Management would be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2.	Same as Alternative B.	Same as Alternative B.	No similar action.
In most LUPs, either no priorities are established or prioritization is given to projects that benefit multiple resources (e.g., livestock, wildlife, wild horses and burros, special status species).	No similar action.	Develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.	Same as Alternative C.	Aggressively respond to new infestations to keeping invasive species from spreading. Every effort should be made to identify and treat new infestations before they become larger problems. Additionally containment of known infestations in or near sagebrush habitats should be a high priority for all land management agencies.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
No similar action.	No similar action.	In GRSG habitat, ensure that soil cover and native herbaceous plants are at their ESD potential to help protect against invasive plants.	No similar action.	No similar action.
Fire and Fuels Management				
Under current management, there is no designated priority habitat. Design projects to minimize the size of wildfire and prevent the further loss of sagebrush. Existing LUPs typically do not include specific management decisions regarding implementation of fuels treatments in sagebrush habitat. In general, both prescribed fire and non-fire fuels treatments are allowed.	In priority habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15% unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of priority GRSG habitat and conserve habitat quality for the species. • Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in the EA process. • Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in a priority area. • Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. • Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species; Connelly et al. 2000, Hagen et al. 2007, Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored and site specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be considered, in stands where cheatgrass is a very minor component in the understory (Brown 1982). • Monitor and control invasive vegetation	Design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15% unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of occupied GRSG habitat and conserve habitat quality for the species. • Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in the EA process. • Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present. • Allow no fuels treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. • Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species; Connelly et al. 2000, Hagen et al. 2007, Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored and site specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be considered, in stands where cheatgrass is a very minor component in the understory (Brown 1982). • Livestock grazing should be excluded from burned areas until woody and	In priority habitat and opportunity areas, design and implement fuels treatments and other range/habitat treatments with an emphasis on maintaining, protecting, and expanding sagebrush ecosystems. • Maintain or enhance sagebrush canopy cover and community structure within GRSG priority habitat to match GRSG habitat objectives unless fuels management objectives requires additional reduction in sagebrush cover to meet strategic protection of priority GRSG habitat or opportunity areas. • Consider comprehensive treatment options, including chemical applications and follow up treatments, to ensure post-treatment success of meeting GRSG habitat and treatment objectives. • Develop a system of fuel breaks to protect larger intact blocks of GRSG habitat. First priority is to protect sagebrush areas that are more-or-less intact and functioning as GRSG habitat by separating or isolating areas dominated by annual grasses. • Avoid constructing fuel breaks through large areas of intact GRSG habitat. • When possible, locate fuel breaks along existing roads, rights-of-way, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops). • Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in the environmental review process. • Apply seasonal restrictions (identified in the special status species- GRSG	Habitat loss due to fire and replacement of (burned) native vegetation by invasive plants is the single greatest threat to GRSG in Utah. While unscheduled fires may occur, response to fire can have a large impact on the severity of the effects, especially over time as rehabilitation or restoration continues. Implement the following: • Create and implement a statewide fire agency agreement(s) that will eliminate jurisdictional boundaries and allow for immediate response to natural fire in priority habitat. • Allow use of fire-retardant vegetation that will buffer areas of high quality GRSG habitat from catastrophic fire. • Use prescriptive fire with caution in sagebrush habitat. The Western Association of Fish and Wildlife Agencies has prepared information that explains the risks from using prescribed fire in xeric sagebrush habitats. • Prescribed fire should only be used at higher elevations and in a manner designed prescriptively to benefit GRSG. • Conduct effective research into controlling fire size and protecting remaining GRSG areas that are adjacent to high-risk cheatgrass areas. • Focus research efforts on effective reclamation and restoration of landscapes altered by wildfire. • Within winter habitat, manage to maintain maximum amount of sagebrush, especially tall sagebrush, which would be available to GRSG above snow during a severe winter. Tall

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	post-treatment. • Rest treated areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise (WGFD 2011). • Require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success (Richards et al. 1998). Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat objectives (Pyke 2011). • Design post fuels management projects to ensure long term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project (Eiswerth and Shonkwiler 2006).	herbaceous plants achieve GRSG habitat objectives. • Where burned GRSG habitat cannot be fenced from other unburned habitat, the entire area (e.g., allotment/pasture) should be closed to grazing until recovered. • Design post fuels management projects to ensure long term persistence of seeded or pre-treatment native plants, including sagebrush. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project (Eiswerth and Shonkwiler 2006).	section above) for implementing fuels management treatments according to the type of seasonal habitats present in a priority area. • Prior to conducting any fuels/habitat treatments in known winter range, work closely with UDWR to design the treatment to either strategically reduce wildfire risk around or in the winter range or to specifically maintain, increase, or enhance areas of vegetation to function as important winter range (for habitat associated with years of average snowfall and habitat for years with abnormally high snowfall amounts). • Allow the use of prescribed fire within priority GRSG habitat if other treatment opportunities have been explored, where site specific variables allow (will not likely result in long-term loss of sagebrush), and in areas where risk of conversion to exotic annual dominance is low and/or could be mitigated by chemical or other means. Prescribed fire in areas of low elevation Wyoming sagebrush should be avoided. • Monitor and control invasive vegetation post-treatment. • Rest treated areas from grazing for two full growing seasons (per BLM policy) unless vegetation recovery dictates otherwise. • Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non-native seeds may be used as long as they result in meeting GRSG habitat objectives. When reseeding, consider using fire resistant native and non-native species on a case-by-case basis to provide for	sagebrush is capable of standing above heavier than normal snowfall. • Sagebrush treatment projects within winter habitat need pre-approval by the appropriate regulatory agency in coordination with the DWR. Sagebrush treatment projects within winter habitat should maintain 80% of the available habitat as tall sagebrush; 20% of the habitat can be managed for younger age classes, if appropriate. • Coordinate the needs and efforts related to sage-grouse with the State of Utah committee that was formed to develop a collaborative process to protect the health and welfare by reducing the size and frequency of catastrophic fires.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			fire breaks, protecting large areas of GRSG priority habitat. - Design post fuels management to ensure long term persistence of seeded or desirable residual plants. During planning for the treatments, address the temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities that are needed to achieve and maintain the desired condition of fuels management projects in priority habitat.	
Design projects to minimize the size of wildfire and prevent the further loss of sagebrush.	Design fuels management projects in priority GRSG habitat to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design.	No similar action.	When designing fuels management projects in priority GRSG habitat, strategically design the treatment to provide the greatest benefit (improve habitat condition, minimize future threat of wildfire, etc.) over the largest area. In some areas, this may require fuels treatments implemented in a more linear versus block design to limit the spread of fire, where other areas could be implemented to reduce fire severity and intensity and improve habitat resilience.	No similar action.
No similar action.	During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels (Diamond et al. 2009), and implement grazing management that will accomplish this objective Davies et al. 2011 and Launchbaugh et al. 2007). Consult with ecologists to minimize impacts to native perennial grasses.	No similar action.	During fuels management project design, consider the use of targeted livestock grazing to strategically reduce fine fuels and, if used, implement grazing management that will accomplish this objective. If implementing targeted grazing, implement measures to minimize impacts to native perennial grasses.	Consider the use of prescriptive grazing to specifically reduce fire size and intensity on all types of landownership, where appropriate. This could be particularly effective in areas where cheatgrass is encroaching on sagebrush habitat. This will require cooperation and coordination among different land managers and owners and livestock owners. In some cases feed supplementation and water hauling may need to be utilized to obtain the desired results.
Prioritize fire suppression to protect human life, human safety, and high value resources. Design fuels treatment projects to minimize the size of wildfire and prevent the further loss of sagebrush.	No similar action.	Mowing of grass will be used in any fuelbreak fuels reduction project (roadsides or other areas).	Proactively protect priority GRSG habitat from fire through strategic wildfire suppression planning. Planning measures may include: - Strategically placed fuel breaks that reduce fuel loading and continuity (e.g., mowing vegetation along roadsides, grazing strategies, herbicide	Create and implement a statewide fire agency agreement(s) that will eliminate jurisdictional boundaries and allow for immediate response to natural fire in priority habitat. These should include fire suppression actions recommended locally, including, but not limited to: - first strike agreements that allow

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			application), or that alter vegetation structure and/or composition (e.g., fire resistant vegetation or green-strip seedings). - Pre-planning of wildfire suppression tactics in important GRSG habitat. - Prioritizing suppression of wildfire in priority habitats. - Conducting burn-out/backfiring operations in a manner that minimizes the loss of sagebrush when possible (e.g., considering use of bulldozers to create anchor lines that may help decrease the size of burnout operations). - Updating strategic planning documents to account for prioritization of GRSG habitats in suppression efforts. - Other applicable fire management strategies.	aggressive fire control on an all-land jurisdictional basis; - allocation of resources to maintain enhanced abilities of all fire agencies to combat ignitions in priority habitat. - allocation of resources to immediately commence restoration of habitats impacted by wildfire by all responsible agencies; and - removal or establishment of waiver provisions for procedural barriers that may impact the ability of responsible agencies to respond to wildfire with effective reclamation or rehabilitation, such as federal raptor stipulations, cultural assessments, and the like.
Under current management there is no designated priority habitat. Prioritize fire suppression to protect human life and high value resources.	In priority GRSG habitat areas, prioritize suppression, immediately after life and property, to conserve the habitat.	Same as Alternative B.	Same as Alternative B. In addition, within priority habitat, prioritize suppression in areas of solid sagebrush. Limit placement of fire infrastructure (e.g., fire camps, helipads, etc.) in areas of solid sagebrush.	Fire by natural ignition should be addressed as a serious threat.
Under current management there is no designated general habitat. Prioritize fire suppression to protect human life and high value resources.	In general GRSG habitat, prioritize suppression where wildfires threaten priority GRSG habitat.	No similar action.	In general GRSG habitat or in opportunity areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent priority GRSG habitat.	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.
The Best Management Practices found in Appendix XX were provided at part of WO IM 2011-138. As such, they would be applied as best management practices to fuels and fire management action as a matter of compliance to BLM policy.	Follow Best Management Practices (WO IM 2011-138, see Appendix XX.)	Same as Alternative B.	Follow the applicable and technically feasible Required Design Features and policies outlined in Appendix XX.	No similar action.
Recently completed LUPs promote use of native species when conducting restoration activities.	Prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from ES&R projects outside of priority GRSG habitat to those inside it. Use of native plant seeds for ES&R seedings is required based on availability, adaptation (site potential), and	Same as Alternative B.	Prioritize the use of native seeds for restoration in priority GRSG habitat and opportunity areas based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, non-native seeds may be used as long as they support GRSG habitat objectives. Re-	Allow use of fire-retardant vegetation that will buffer areas of high quality GRSG habitat from catastrophic fire.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	probability of success (Richards et al. 1998). Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.		establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the principle objective for rehabilitation efforts.	
All LUPs, which are written in accordance with applicable program direction, include management actions that allow the administrating agency to make adjustments to livestock grazing, wild horse and burro management, and travel management on a case-by case basis following restoration activities.	Design post Emergency Stabilization and Rehabilitation (ES&R)/Burned Area Emergency Rehabilitation (BAER) management to ensure long term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse and burro, and travel management, etc., to achieve and maintain the desired condition of ES&R projects to benefit GRSG (Eiswerth and Shonkwiler 2006).	Same as Alternative B.	Same as Alternative B. In addition, establish fuel breaks/green strips through the ES&R efforts to be proactive in future management.	Immediate, proactive means to reduce or eliminate the spread of invasive species, particularly cheatgrass, after a wildfire, is a high priority.
No similar action.	Consider potential changes in climate (Miller at al. 2011) when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed. (Kramer and Havens 2009).	Same as Alternative B.	No similar action.	No similar action.
No similar action.	No similar action.	Establish and strengthen networks with seed growers to assure availability of native seed for ES&R projects.	No similar action.	No similar action.
No similar action.	No similar action.	Post fire recovery must include establishing adequately sized exclosures (free of livestock grazing) that can be used to assess recovery.	To assist in monitoring long-term recovery efforts, consider establishing short-term exclosures free from livestock grazing within priority habitat that has been burned. When the area has met applicable GRSG habitat objectives, the exclosures may be removed, unless they can be maintained through long-term maintenance or if more long-term monitoring is necessary for determination of GRSG objectives.	No similar action.
Energy Development (applicable to all types of minerals and all minerals development activities)				
No similar action.	No similar action.	No similar action.	No similar action.	Within priority habitat, limit or ameliorate impacts through the use of the general

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
				stipulations identified in the Sage-Grouse section. Engage in reclamation efforts as projects advance or are completed. Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim disturbed areas, and remove those barriers in order to achieve immediate and effective reclamation, if otherwise allowable by law. Prioritize areas for habitat improvement to make best use of mitigation funds.
Non-Energy Leasable Minerals				
Under current management there is no designated priority habitat. Manage non-energy leasable minerals on federal lands and non-federal lands with federal mineral interests within GRSG habitat as follows: • Open to Leasing Consideration – 3,870,080 acres • Closed to Leasing – 138,500 acres Recent plans may apply stipulations identified for fluid mineral leasing to all surface disturbing activities.	Close federal lands and non-federal lands with federal mineral interests within priority habitat to non-energy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine. Manage non-energy leasable minerals on federal lands and non-federal lands with federal mineral interests within GRSG habitat as follows: • Open to Leasing Consideration – 667,280 acres • Closed to Leasing – 3,341,300 acres	Close federal lands and non-federal lands with federal mineral interests within occupied GRSG habitat to non-energy leasable mineral leasing (4,008,580 acres). This includes not permitting any new leases to expand an existing mine.	<u>Proposed Leases Associated with Surface Mining:</u> Manage non-energy leasable minerals on federal lands and non-federal lands with federal mineral interests within GRSG habitat as follows: • Open to Leasing Consideration – 705,680 acres • Closed to Leasing with Development by Surface Mining – 2,905,100 acres • Closed to All Leasing– 397,800 acres Priority habitat would be closed to new leasing or lease modification of surface non-energy leasable minerals. This includes not issuing or modifying leases to expand existing mines that would result in surface mining. New or modified leases in areas outside priority habitat and within 4 miles of an occupied lek located within priority habitat would have use stipulations attached. Development within these areas could occur if: • the development meets noise restrictions both during development and after development (noise at	Manage non-energy leasable minerals on federal lands and non-federal lands with federal mineral interests within GRSG habitat as follows: • Open to Leasing Consideration – 3,870,080 acres • Closed to Leasing – 138,500 acres Consider leasing federal lands and non-federal lands with federal mineral interests within priority habitat for non-energy leasable minerals. Limit or ameliorate impacts from mineral leasing and development through the use of the following stipulations: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); and • the structures remaining after development meet tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography). General habitat within 1 mile of an occupied lek, if the lek is located within general habitat, would have no surface disturbance stipulations associated with leasing of surface non-energy leasable minerals. This could effectively close these areas to surface mining, although the stipulation could be waived if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority habitat or opportunity areas. Leases Associated with Sub-Surface Mining: Consider leasing priority habitat for non-energy leasable minerals that would be extracted through sub-surface mining. Require the following stipulations, as applicable, as part of any new mining leases or lease modification for sub-surface non-energy mines: • Avoid placement of appurtenant facilities within priority GRSG habitat. • If placement of facilities outside of priority GRSG habitat is not technically feasible while still protecting GRSG habitat, surface disturbances associated with the lease can be	lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat (nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			permitted if they meet the following criteria: o No surface facilities (e.g., mine entrances, vent shafts, etc.) would be located within 1 mile of an occupied lek that is located within priority habitat. o the long-term development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season), including from supporting traffic along roads; o restrictions on permanent (facility remains in place during breeding season) tall structures are required (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography) to minimize increases in predation and area avoidance by grouse; o the construction of the development does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); avoidance periods and necessary mitigation may be dependent on site specific conditions and noise levels; o the surface disturbance from the development does not exceed the 5% disturbance limit; and o Additional mitigation methods applicable to the specific project are conducted, including off-site	• Recognize that surface vents associated with underground mining are essential for human safety, and must be permitted under the provisions of this alternative.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			mitigation. If the above criteria cannot be met, do not grant new leases or modifications.	
Under current management there is no designated general habitat. Recent plans may apply stipulations identified for fluid mineral leasing to all surface disturbing activities.	No similar action.	No similar action.	Consider leasing general habitat for non-energy leasable minerals that would be extracted through sub-surface mining. Minimize surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on GRSG habitats. Consider applying the criteria identified for priority habitat. Use additional, onsite or off-site mitigation to offset impacts as technically appropriate (determined by local options/needs). Determine which measures are needed to protect general GRSG habitat during activity level planning. The above mitigation strategy may be waived if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority habitat or opportunity areas.	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.
No similar action.	No similar action.	No similar action.	Commercial prospecting activities associated with non-energy leasable minerals would be required to comply to the following criteria: • Surface disturbance from the activity does not exceed the 5% disturbance limit; • The non-casual use activity does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); • Any facilities associated with prospecting activities will be removed before the next breeding season; and • Any disturbances will be reclaimed.	Commercial prospecting activities associated with non-energy leasable minerals would be required to comply with the same stipulations identified for leasing and development, above.
No similar action. Individual land use plans may contain an appendix that outlines BMPs that are applied on a case-by-case basis.	For existing non-energy leasable mineral leases in priority habitat, in addition to the solid minerals required design features (RDF) (Appendix E of the NTT Report), follow the same RDFs applied to Fluid Minerals (Appendix D of the NTT Report), when wells are used for solution mining.	Same as Alternative B.	For existing non-energy leasable mineral leases in priority habitat, apply the applicable solid minerals RDFs (Appendix E of the NTT Report) and Fluid Minerals RDFs (Appendix D of the NTT Report) when permitting site-specific projects on the lease (e.g., wells used for solution mining), unless at least one	No similar action.

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat; • Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed.	
Solid Minerals - Coal				
Leases Associated with Surface Mining: Under current management there is no designated priority habitat. Find approximately 22,900 acres of occupied sage-grouse habitat unsuitable for surface mining of coal under the criteria set forth in 43 CFR 3461.5. For all other areas, upon receipt of a coal lease application in sage grouse habitat, the BLM will review criterion 15 set forth in 43 CFR 3461.5 to determine if the specific area being proposed for lease is suitable. If the BLM and the State of Utah "jointly agree" the federal lands do not contain GRSG habitat that is "of high interest to the state and which are essential for maintaining [this] priority wildlife…species," the area shall be considered suitable for further coal leasing consideration. The determination would be that "all or certain stipulated methods of coal mining would not have a significant long-term impact" on the sage grouse. However, special conditions, conservation measures, and pre-project mitigation requirements that include successful criteria of habitat suitability and GRSG occupancy could be	Leases Associated with Surface Mining: In priority habitat, find unsuitable all surface mining of coal under the criteria set forth in 43 CFR 3461.5 (3,328,760 acres).	Leases Associated with Surface Mining: In occupied habitat, find unsuitable all surface mining of coal under the criteria set forth in 43 CFR 3461.5 (4,008,580 acres).	Leases Associated with Surface Mining: Upon receipt of a coal lease application in sage grouse priority habitat, the BLM will review criterion 15 set forth in 43 CFR 3461.5 to determine if the specific area being proposed for lease is suitable. If the BLM and the State of Utah "jointly agree" the federal lands do not contain GRSG habitat that is "of high interest to the state and which are essential for maintaining [this] priority wildlife…species," the area shall be considered suitable for further coal leasing consideration. The determination would be that "all or certain stipulated methods of coal mining would not have a significant long-term impact" on the sage grouse. However, special conditions, conservation measures, and pre-project mitigation requirements that include successful criteria of habitat suitability and GRSG occupancy could be required as identified during the leasing process to protect GRSG habitat. If, upon receipt of a coal lease application, the BLM and the State of Utah "jointly agree" that the federal lands contain GRSG habitat that is "of high interest to the state and which are essential for maintaining [this] priority	Leases Associated with Surface Mining: Priority habitat would considered to be suitable for further coal leasing consideration. However, special conditions, conservation measures, and pre-project mitigation requirements that include successful criteria of habitat suitability and GRSG occupancy could be required as identified during the leasing process to protect GRSG habitat. Impacts to GRSG within leasing areas would be limited or ameliorated through the use of the following stipulations: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season.

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
required as identified during the leasing process to protect GRSG habitat. If, upon receipt of a coal lease application, the BLM and the State of Utah “jointly agree” that the federal lands contain GRSG habitat that is “of high interest to the state and which are essential for maintaining [this] priority wildlife…species,” the area shall be considered unsuitable for further coal leasing consideration.			wildlife…species,” the area shall be considered unsuitable for further coal leasing consideration.	• Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat (nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area’s priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable.
Leases Associated with Sub-Surface Mining:	Leases Associated with Sub-Surface Mining:	Leases Associated with Sub-Surface Mining:	Leases Associated with Sub-Surface Mining:	Leases Associated with Sub-Surface Mining:

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
Under current management there is no designated priority habitat. Most LUPs do not identify areas that are specifically closed to coal leasing. Recent LUPs apply stipulations identified for fluid mineral leasing to all surface disturbing activities.	Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of the priority GRSG habitat area.	Same as Alternative B.	Consider leasing priority habitat for coal that would be extracted through sub-surface mining. Require the following stipulations, as applicable, as part of any new mining leases or lease modification for sub-surface coal mines: • Avoid placement of appurtenant facilities within priority GRSG habitat. • If placement of facilities outside of priority GRSG habitat is not technically feasible while still protecting GRSG habitat, surface disturbances associated with the lease can be permitted if they meet the following criteria: o No surface facilities (e.g., mine entrances, vent shafts, etc.) would be located within 1 mile of an occupied lek that is located within priority habitat. o the long-term development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season), including from supporting traffic along roads; o restrictions on permanent (facility remains in place during breeding season) tall structures are required (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography) to minimize increases in predation and area avoidance by grouse; o the construction of the	Consider leasing priority habitat for coal that would be extracted through sub-surface mining. Impacts would be limited or ameliorated through adherence to the following stipulations: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat (nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			development does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); avoidance periods and necessary mitigation may be dependent on site specific conditions and noise levels; o Surface disturbance from the development does not exceed the 5% disturbance limit; and o Additional mitigation methods applicable to the specific project are conducted, including off-site mitigation. If the above criteria cannot be met, do not grant new leases or modifications.	demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable. • Recognize that surface vents associated with underground mining are essential for human safety, and must be permitted under the provisions of this alternative.
Under current management there is no designated general habitat. Most LUPs do not identify areas that are specifically closed to coal leasing. Recent LUPs apply stipulations identified for fluid mineral leasing to all surface disturbing activities.	No similar action.	No similar action.	Consider leasing general habitat for coal that would be extracted through sub-surface mining. Minimize surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on GRSG habitats. Consider applying the criteria identified for priority habitat. Use additional, onsite or off-site mitigation to offset impacts as technically appropriate (determined by local options/needs). Determine which measures are needed to protect general GRSG habitat during activity level planning. The above mitigation strategy may be waived if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority habitat or opportunity areas.	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.
Under current management there is no designated priority habitat. Exploration	No similar action.	No similar action.	Exploration activities within priority habitat needed to meet data adequacy standards	Exploration activities within priority habitat would be required to comply with the same

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
activities are required to comply with season stipulations (i.e., brooding/nesting and winter).			associated with potential coal leasing would be required to comply to the following criteria: • Surface disturbance from the activity does not exceed the 5% disturbance limit; • The activity does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); • Any facilities associated with exploration activities will be removed before the next breeding season; and • Any disturbances will be reclaimed.	stipulations identified for leasing and development, above.
No similar action.	For coal mining operations on existing leases: *Sub-surface mining:* in priority GRSG habitat areas, place any new appurtenant facilities outside of priority areas. Where new appurtenant facilities associated with the existing lease cannot be located outside the priority GRSG habitat area, co-locate new facilities within existing disturbed areas. If this is not possible, then build any new appurtenant facilities to the absolute minimum standard necessary.	Same as Alternative B.	Same as Alternative B	No similar action.
All land use plans include management actions based on specific program direction. These management actions require the BLM to consider measures that would reduce or eliminate impact of human activities during activity level planning.	For coal mining operations on existing leases: In general habitat, apply minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity level planning. Use additional, effective mitigation to offset impacts as appropriate (determined by local options/needs).	Same as Alternative B.	Same as Alternative B	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.
Locatable Minerals				
Under current management there is no designated priority habitat. Approximately	In priority habitat, propose withdrawal from mineral entry based on risk to the GRSG and	In occupied habitat, propose withdrawal from mineral entry based on risk to the GRSG and	Priority and general habitat that is not already withdrawn or proposed for	Priority and general habitat that is not already withdrawn or proposed for

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
498,700 acres of occupied sage-grouse habitat are proposed withdrawal from mineral entry.	its habitat from conflicting locatable mineral potential and development (3,650,900 acres. • Make any existing claims within the withdrawal area subject to validity exams or buy out. Include claims that have been subsequently determined to be null and void in the proposed withdrawal. • In plans of operations required prior to any proposed surface disturbing activities, include the following: o Additional, effective mitigation in perpetuity for conservation (In accordance with existing policy, WO IM 2008-204). Example: purchase private land and mineral rights or severed federal mineral rights within the priority area and deed to US Government). o Consider seasonal restrictions if deemed effective.	its habitat from conflicting locatable mineral potential and development (4,008,580 acres). Everything else, same as Alternative B.	withdrawal would be available for locatable mineral entry. To the extent allowable by law, work with claimants to apply the seasonal restrictions and use restrictions for priority and general habitats identified in the Special Status Species section above. To the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance from locatable mineral development in priority habitat to under the 5% disturbance limit, or provide for enhancement of priority habitat through on-site and/or off-site mitigation.	withdrawal would be available for locatable mineral entry. To the extent allowable by laws and regulations and to the extent the claimant would be willing to apply the standards, impacts would be limited or ameliorated through the use of the following stipulations: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
				(nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable. • Recognize that surface vents associated with underground mining are essential for human safety, and must be permitted under the provisions of this alternative.
No similar action.	Make applicable Best Management Practices (see Appendix E) mandatory as Conditions of Approval within priority GRSG habitat.	Same as Alternative B.	Apply the design features identified in Appendix E (of the NTT report), to the extent allowable by law, unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat; • Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed.	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
Mineral Materials				
Manage mineral materials in GRSG habitat as follows: • open to mineral materials development: 3,935,080 acres • closed to mineral materials development: 73,500 acres Recent LUPs apply stipulations identified for fluid mineral leasing to all surface disturbing activities.	Manage mineral materials in GRSG habitat as follows: • open to mineral materials development: 668,580 acres • closed to mineral materials development: 3,340,000 acres	Manage mineral materials in GRSG habitat as follows: • open to mineral materials development: 0 acres • closed to mineral materials development: 4,008,580 acres	Manage mineral materials in GRSG habitat as follows: • open to mineral materials development: 688,280 acres • closed to commercial mineral materials development, open to non-commercial: 2,967,500 acres • closed to mineral materials development: 352,800 acres	Manage mineral materials in GRSG habitat as follows: • open to mineral materials development: 3,935,080 acres • closed to mineral materials development: 73,500 acres

Same as previous decision.	Close priority habitat to mineral material sales.	Close occupied habitat to mineral material sales.	Priority and general habitat within 1 mile of an occupied lek would be closed to mineral materials.
			Priority habitat beyond 1 mile of an occupied lek that is located within priority habitat would be closed to commercial development of mineral materials.
			Non-commercial development of mineral materials (e.g., community pits, free-use permits) within priority habitat beyond 1 mile of an occupied lek, if the lek is located within priority habitat, could only occur if the following conditions are met:
			• the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season);
			• the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography);
			• initial activity within the development
				Priority habitat would be open to mineral materials. Impacts would be limited or ameliorated through the use of the following stipulations:
				• New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself.
				• No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek.
				• New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek.
				• A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season.
				• Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise)
				• Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats:
				  o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding.
				  o In nesting and brood-rearing areas from Apr 1 – Aug 15.
				  o In winter habitat from Nov 15 – Mar 15.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter); • new disturbance associated with the development does not result in total disturbance exceeding the 5% disturbance limit. • where possible, the development is located adjacent to the footprint of existing disturbances; and • extraction or crushing operations do not occur in GRSG habitat during seasonal restriction times; however, removal of material from existing stockpiles would be allowed. • new developments are located within 0.25 mile of existing roads. Development of mineral materials within general habitat beyond 1 mile of an occupied lek, if the lek is located within general habitat, could occur if: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); • initial activity within the development does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter).	o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat (nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			General habitat within and beyond the 1.0 mile avoidance area would require discussion with UDWR during project implementation, and implementation of best management practices (e.g., anti-perch devices for raptors, etc.). The stipulations within general habitat (closure or restrictions) could be waived, except for the seasonal stipulations, if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority habitat or opportunity areas.	
No similar action.	In priority habitat, restore mineral materials pits no longer in use to meet GRSG habitat conservation objectives.	Same as Alternative B.	No similar action.	No similar action.
FLUID MINERALS				
Manage fluid mineral leasing in GRSG habitat as follows: • open to leasing, subject to standard stipulations: 1,333,380 acres • open to leasing, subject to controlled surface use (CSU) and/or timing stipulations: 1,300,400 acres • open to leasing, subject to no surface occupancy (NSO) stipulations: 483,500 acres • closed to leasing: 138,500 acres • no fluid minerals allocation: 187,000 acres • planning decision not mapped: 565,800 acres Manage fluid minerals outside of GRSG habitat but in population areas as follows: • open to leasing, subject to standard stipulations: 893,100 acres • open to leasing, subject to CSU and/or timing stipulations: 580,700 acres • open to leasing, subject to NSO stipulations: 594,100 acres • closed to leasing: 196,800 acres • no fluid minerals allocation: 285,700 acres	Manage fluid mineral leasing in GRSG habitat as follows: • open to leasing, subject to standard stipulations: 246,680 acres • open to leasing, subject to CSU and/or timing stipulations: 255,900 acres • open to leasing, subject to NSO stipulations: 24,400 acres • closed to leasing: 3,341,300 acres • no fluid minerals allocation: 43,400 acres • planning decision not mapped: 96,900 acres Manage fluid minerals outside of GRSG habitat but in population areas the same as Alternative A.	Manage fluid mineral leasing in GRSG habitat as follows: • open to leasing, subject to standard stipulations: 0 acres • open to leasing, subject to CSU and/or timing stipulations: 0 acres • open to leasing, subject to NSO stipulations: 0 acres • closed to leasing: 3,821,580 acres • no fluid minerals allocation: 187,000 acres • planning decision not mapped: 0 acres Manage fluid minerals outside of GRSG habitat but in population areas the same as Alternative A.	Manage fluid mineral leasing in GRSG habitat as follows: • open to leasing, subject to standard stipulations: 0 acres • open to leasing, subject to CSU and/or timing stipulations: 1,829,980 acres • open to leasing, subject to NSO stipulations: 1,853,100 acres • closed to leasing: 138,500 acres • no fluid minerals allocation: 187,000 acres • planning decision not mapped: 0 acres Manage fluid minerals outside of GRSG habitat but in population areas as follows: • open to leasing, subject to standard stipulations: 761,100 acres • open to leasing, subject to CSU and/or timing stipulations: 765,300 acres • open to leasing, subject to NSO stipulations: 598,800 acres • closed to leasing: 196,800acres • no fluid minerals allocation: 285,700 acres • planning decision not mapped: 177,200 acres	Manage fluid mineral leasing in GRSG habitat as follows: • open to leasing, subject to standard stipulations: 247,200 acres • open to leasing, subject to CSU and/or timing stipulations: 2,842,180 acres • open to leasing, subject to NSO stipulations: 483,500 acres • closed to leasing: 138,500 acres • no fluid minerals allocation: 187,000 acres • planning decision not mapped: 110,200 acres Manage fluid minerals outside of GRSG habitat but in population areas as follows: • open to leasing, subject to standard stipulations: 858,600 acres • open to leasing, subject to CSU and/or timing stipulations: 630,100 acres • open to leasing, subject to NSO stipulations: 594,100 acres • closed to leasing: 196,800 acres • no fluid minerals allocation: 285,700 acres • planning decision not mapped: 219,600 acres

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
- planning decision not mapped: 234,500 acres				
Unleased Federal Fluid Mineral Estate				
Unleased Areas within Priority Habitat: Under current management there is no designated priority habitat. Fluid mineral leasing in sage grouse occupied habitat will be managed as discussed above. Most LUPs include a management action that prohibits surface disturbing or other disruptive within GRSG breeding and nesting habitat within a certain distance and between certain dates. The protect buffers around leks vary from 0.25 miles and 3.1 miles. In general, recently completed plans include a larger protective buffer. Recently completed plans also include a management action that prohibits surface disturbing activity or disruptive activities during certain dates in winter habitat.	Unleased Areas within Priority Habitat: Close priority GRSG habitat areas to fluid mineral leasing. Upon expiration or termination of existing leases, do not accept nominations/expressions of interest for parcels within priority areas.	Unleased Areas within Priority Habitat: No new leases or permits will be issued in occupied GRSG habitat. Upon expiration or termination of existing leases, do not accept nominations/expressions of interest for parcels within occupied habitat.	Unleased Areas within Priority Habitat: Areas outside GRSG priority habitat but within 1 mile of an occupied lek, if the lek is located within priority habitat, would be open to leasing fluid minerals, subject to NSO stipulations. Priority habitat within 4 miles of an occupied lek, if the lek is located within priority habitat, would be designated as open to oil and gas leasing subject to NSO stipulations. Priority habitat beyond 4 miles of an occupied lek, if the lek is located within priority habitat, would be designated as open to oil and gas leasing subject to controlled surface use stipulations (see list below) and the following timing stipulations: • Winter habitat from Nov 15 – Mar 15 • Brood rearing habitat from Apr 15 – Jul 15 • Breeding and nesting habitat from Feb 15 – Jun 15 Where leasing/development is allowed within priority habitat, development could occur if it adhered to the following controlled surface use stipulations: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to	Unleased Areas within Priority Habitat: Priority habitat would be designated as open to oil and gas leasing subject to controlled surface use stipulations (see list below) and the timing stipulations. Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats (specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist): • Winter habitat from Nov 15 – Mar 15. • Nesting and brood-rearing areas from Apr 1 – Aug 15. • On leks from Feb 15 – May 15 Where leasing/development is allowed within priority habitat, impacts from development would be limited or ameliorated through the use of the following controlled surface use stipulations: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise)

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); • operators must submit a site-specific plan of development for roads, wells, pipelines and other infrastructure prior to any development being authorized; this plan should outline how development on the lease will limit habitat fragmentation; and • the development does not exceed the 5% disturbance limit. Areas outside priority habitat and within 4 miles of an occupied lek, if the lek is located within priority habitat, would be designated as open to oil and gas leasing subject to controlled surface use stipulations. Development in these areas could occur if it adhered to the following controlled surface use stipulations: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); and • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography). The design features identified in Appendix D (of the NTT report) would be attached as lease notices to all new leases in priority habitat and would be applied during the	• Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat (nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area’s priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			permitting process unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat; • Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within priority habitat. Smaller parcels may be leased only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements.	
Allow geophysical exploration in areas that are not closed to fluid mineral leasing. Geophysical exploration in GRSG habitat shall be subject to seasonal restrictions discussed above.	Allow geophysical exploration within priority GRSG habitat areas to obtain exploratory information for areas outside of and adjacent to priority GRSG habitat areas. Allow geophysical operations only by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply.	No new geophysical exploration permits will be issued.	Allow geophysical exploration within occupied sage-grouse habitat areas to obtain exploratory information. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by GRSG.	Allow geophysical exploration within priority GRSG habitat to obtain exploratory information. Geophysical exploration would be subject to the same seasonal and controlled surface use stipulations as would be applied to leases within priority habitat.
Under current management there is no designated general habitat. Fluid mineral leasing in sage grouse occupied habitat will be managed as discussed above.	No similar action.	No general habitat is identified.	Unleased Areas within General Habitat: Areas within 1 mile of an occupied lek, if the lek is located within general habitat,, whether the area is in occupied or unoccupied GRSG habitat, would be open to leasing fluid minerals, subject to NSO stipulations.	GRSG habitat outside priority habitat would not be managed for the conservation of the species. No specific management actions are provided for this habitat.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			General habitat beyond 1 mile of an occupied lek, if the lek is located within general habitat, would be designated as open to oil and gas leasing subject to controlled surface use stipulations (see list below) and the following timing stipulations: • Winter habitat from Nov 15 – Mar 15 • Brood rearing habitat from Apr 15-Jul 15 • Breeding and nesting habitat from Feb 15-Jun 15 Where leasing/development is allowed within general habitat, development could occur if it adhered to the following controlled surface use stipulations: • the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); and • the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography). General habitat within and beyond the 1.0 mile NSO area would require coordination with UDWR during project implementation, and implementation of best management practices (e.g., anti-perch devices for raptors, etc.). The design features identified in Appendix D (of the NTT report) would be attached as lease notices to all new leases in general	

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			habitat and would be applied during the permitting process unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat; • Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed. The stipulations within general habitat (closure or restrictions) could be waived, except for the seasonal stipulations, if off-site mitigation coordinated with BLM/FS and UDWR is successfully completed in priority habitat or opportunity areas.	
Leased Federal Fluid Mineral Estate				
No similar action.	In priority habitat, apply the following conservation measures through RMP implementation decisions (e.g., approval of an Application for Permit to Drill, Sundry Notice, etc.) and upon completion of the environmental record of review (43 CFR 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: 1. Whether the conservation measure is “reasonable” (43 CFR 3101.1-2) with the valid existing rights; and 2. Whether the action is in conformance with the approved RMP.	Apply the following conservation measures (rows) as Conditions of Approval at the project and well permitting stages, and through RMP implementation decisions and upon completion of the environmental record of review (43 CFR § 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: 1. Whether the conservation measure is “reasonable” (43 CFR § 3101.1-2) with the valid existing rights; and 2. Whether the action is in conformance with the approved RMP.	In priority habitat, apply the following conservation measures (rows) through implementation decisions (e.g., approval of an Application for Permit to Drill, Sundry Notice, etc.) and upon completion of the environmental record of review (43 CFR 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: 1. Whether the conservation measure is “reasonable” (43 CFR 3101.1-2) with the valid existing rights; and 2. Whether the action is in conformance with the approved RMP.	All existing uses are explicitly recognized by this alternative and shall not be affected by the implementation of this alternative. The sage-grouse conservation measures identified in the associated NEPA documents for each of these projects would continue to be implemented to protect GRSG and its habitat. Provisions of this plan would not be added to the measures identified each specific project.
No similar action. Measures that reduce or eliminate impacts to GRSG are considered on a case-by-case basis during implementation level planning.	Do not allow new surface occupancy on federal leases within priority habitats, this includes winter concentration areas (Doherty et al. 2008, Carpenter et al. 2010) during any time of the year. Consider an exception: • If the lease is entirely within priority	Same as Alternative B.	Apply the 5% disturbance limitation for development within priority habitat. Where GRSG conservation opportunities exist, work in cooperation with operators in priority and general habitat to minimize	All existing uses are explicitly recognized by this alternative and shall not be affected by the implementation of this alternative. The sage-grouse conservation measures identified in the associated NEPA documents for each of these projects would continue to

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	habitats, apply a 4-mile NSO around the lek, and limit permitted disturbances to 1 per section with no more than 3% surface disturbance in that section. • If the entire lease is within the 4-mile lek perimeter, limit permitted disturbances to 1 per section with no more than 3% surface disturbance in that section. Require any development to be placed at the most distal part of the lease from the lek, or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to GRSG.		habitat loss, fragmentation, and direct and indirect effects to GRSG and habitat. Issue Written Orders of the Authorized Officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize effects to GRSG populations and habitat. In areas where GRSG populations have been substantially diminished, and where few birds remain, include actions in the authorization (e.g., siting/designing infrastructure, hastened habitat restoration) that will minimize habitat loss and promote restoration of habitat when development activities cease. In addition to considering opportunities for onsite mitigation, cooperate with project proponents to develop and consider implementing appropriate off-site mitigation that the BLM/FS, coordinating with the respective state wildlife agency, determines would avoid or minimize habitat and population-level effects. Where possible, off-site mitigation should occur within the same population area where the impact is incurred. When developing such mitigation, consider compensating for the short-term and long-term direct and indirect loss of GRSG and its habitat. For geophysical exploration activities, include seasonal timing limitations and BMPs as permit conditions of approval to eliminate or minimize surface-disturbing and disruptive activities within nesting and brood-rearing habitat and winter concentration areas. Ensure authorizations under Onshore Oil and Gas Order No. 7 (Disposal of Produced Water) consider the potential impacts to GRSG from West Nile virus and develop	be implemented to protect GRSG and its habitat. Provisions of this plan would not be added to the measures identified each specific project.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			appropriate mitigation measures.	
Most LUPs include a management action that prohibits surface disturbing or other disruptive within GRSG breeding and nesting habitat within a certain distance and between certain dates. The protect buffers around leks vary from 0.25 miles and 3.1 miles. In general, recently completed plans include a larger protective buffer. Recently completed plans also include a management action that prohibits surface disturbing activity or disruptive activities during certain dates in winter habitat.	Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and early brood-rearing season in all priority GRSG habitat during this period.	Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and brood-rearing season in all occupied sage-grouse habitat during this period. This seasonal restriction shall also apply to related activities that are disruptive to GRSG, including vehicle traffic and other human presence.	Same as Alternative B.	Allow exploratory drilling within priority GRSG habitat, subject to the same seasonal and controlled surface use stipulations as would be applied to leases within priority habitat.
No similar action.	BLM should closely examine the applicability of categorical exclusions in priority habitat. If extraordinary circumstances review is applicable, BLM should determine whether those circumstances exist.	Same as Alternative B.	No similar action.	No similar action.
No similar action.	Complete Master Development Plans in lieu of Application for Permit to Drill (APD)-by-APD processing for all but wildcat wells.	Same as Alternative B.	Within priority habitat, operators must submit a site-specific plan of development for roads, wells, pipelines and other infrastructure prior to any development being authorized. The BLM will evaluate the plan through the NEPA process.	No similar action.
No similar action.	When permitting APDs on existing leases that are not yet developed, the proposed surface disturbance cannot exceed 3% for that area. Consider an exception if: • Additional, effective mitigation is demonstrated to offset the resulting loss of GRSG (see Objectives). o When necessary, conduct additional, effective mitigation in 1) priority GRSG habitat areas or – less preferably – 2) general GRSG habitat (dependent upon the area-specific ability to increase GRSG populations). o Conduct additional, effective mitigation first within the same population area where the impact is realized, and if not possible then conduct mitigation within the same	When permitting APDs on existing leases that are not yet developed, the proposed surface disturbance cannot exceed 3% per section for that area. Consider an exception if: • Additional, effective mitigation is demonstrated to offset the resulting loss of GRSG (see Objectives). o When necessary, conduct additional, effective mitigation in 1) priority GRSG habitat areas or – less preferably – 2) general GRSG habitat (dependent upon the area-specific ability to increase GRSG populations). o Conduct additional, effective mitigation first within the same population area where the impact is realized, and if not possible then	Same as Alternative B, but with a 5% disturbance ceiling.	All existing uses are explicitly recognized by this alternative and shall not be affected by the implementation of this alternative. The sage-grouse conservation measures identified in the associated NEPA documents for each of these projects would continue to be implemented to protect GRSG and its habitat. Provisions of this plan would not be added to the measures identified each specific project.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	Management Zone as the impact, per 2006 WAFWA Strategy – pg 2-17.	conduct mitigation within the same Management Zone as the impact, per 2006 WAFWA Strategy – pg 2-17.		
No similar action. Current policy allows unitization to occur on a case-by-case basis.	Require unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts to GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6.	Same as Alternative B.	Encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts to GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6.	No similar action.
Most LUPs include a management action that allows for acquisition of lands that have important resource values including crucial wildlife habitat and land tenure adjustments to improve the manageability of public lands. In order to be considered for any form of land tenure adjustment, all lands not specifically identified for disposal must meet criteria included in the LUPs.	Identify areas where acquisitions (including federal mineral rights) or conservation easements, would benefit GRSG habitat.	Same as Alternative B.	Same as Alternative B.	No similar action.
No similar action. Current policy provides for the establishment of reclamation bonds on a case-by-case basis.	For future actions, require a full reclamation bond specific to the site in accordance with 43 CFR 3104.2, 3104.3, and 3104.5. Insure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000, Hagen et al. 2007) that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.	Same as Alternative B.	Same as Alternative B.	No similar action.
No similar action. Individual land use plans may contain an appendix that outlines BMPs that are applied on a case-by-case basis.	Make applicable Best Management Practices (BMPs, see Appendix D of the NTT Report) mandatory as Conditions of Approval within priority GRSG habitat.	Same as Alternative B.	The design features identified in Appendix D (of the NTT report) would be attached as mandatory Conditions of Approval during development of a lease unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat;	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
			• Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed.	
No similar action.	No similar action.	Any oil, gas, geothermal activity will be conducted to maximize avoidance of impacts, based on evolving scientific knowledge of impacts.	No similar action.	No similar action.
Mineral Split Estate				
Under current management, there is no priority habitat. Decision included in current management plans apply to both federal surface and mineral estate.	Where the federal government owns the mineral estate in priority habitat, and the surface is in non-federal ownership, apply the conservation measures applied on public lands.	Same as Alternative B.	Same as Alternative B.	Because the surface estate is the key to conservation of habitat, the GRSG habitat has been mapped according to surface ownership. However, implementation of his alternative will have to accommodate the dominant nature of the mineral estate, and react accordingly.
No similar action. Under current management, there is no priority habitat. Decision included in current management plans apply to both federal surface and mineral estate. Individual land use plans may contain an appendix that outlines BMPs that are applied on a case-by-case basis.	Where the federal government owns the surface, and the mineral estate is in non-federal ownership in priority habitat, apply appropriate Fluid Mineral BMPs (see Appendix D of the NTT Report) to surface development.	Same as Alternative B.	Where the federal government owns the surface, and the mineral estate is in non-federal ownership in priority habitat, the design features identified in Appendix D (of the NTT Report) would be attached as a lease notice to all new leases and as mandatory Conditions of Approval on existing leases unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat; • Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed..	No similar action.
Comprehensive Travel and Transportation Management				
Manage OHV use in GRSG habitat as follows: • Open to cross-country use: 797,000	Manage OHV use in GRSG habitat as follows: • Open to cross-country use: 34,600	Manage OHV use in GRSG habitat as follows: • Open to cross-country use: 0 acres	Manage OHV use in GRSG habitat as follows: • Open to cross-country use: 77,000	Manage OHV use in GRSG habitat as follows: • Open to cross-country use: 351,700

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
acres - Limited to existing routes: 437,400 acres - Limited to designated routes: 1,217,700 acres - Closed: 32,200 acres - No decision mapped: 15,100 acres - Forest Service: 814,400 acres (The Forest Service does not use similar OHV management categories. OHV use on National Forest Lands within the planning area is limited to roads, trails, and areas that have been designated through a transportation planning process.)	acres - Limited to existing routes: 1,213,500 acres - Limited to designated routes: 1,217,700 acres - Closed: 32,200 acres - No decision mapped: 1,400 acres - Forest Service: 814,400 acres (The Forest Service does not use similar OHV management categories. OHV use on National Forest Lands within the planning area is limited to roads, trails, and areas that have been designated through a transportation planning process.)	- Limited to existing routes: 1,249,500 acres - Limited to designated routes: 1,217,700 acres - Closed: 32,200 acres - No decision mapped: 0 acres - Forest Service: 814,400 acres (The Forest Service does not use similar OHV management categories. OHV use on National Forest Lands within the planning area is limited to roads, trails, and areas that have been designated through a transportation planning process.)	acres - Limited to existing routes: 1,166,500 acres - Limited to designated routes: 1,217,700 acres - Closed: 32,200 acres - No decision mapped: 6,000 acres - Forest Service: 814,400 acres (The Forest Service does not use similar OHV management categories. OHV use on National Forest Lands within the planning area is limited to roads, trails, and areas that have been designated through a transportation planning process.)	acres - Limited to existing routes: 888,000 acres - Limited to designated routes: 1,217,700 acres - Closed: 32,200 acres - No decision mapped: 9,800 acres - Forest Service: 814,400 acres (The Forest Service does not use similar OHV management categories. OHV use on National Forest Lands within the planning area is limited to roads, trails, and areas that have been designated through a transportation planning process.)
Under current management, there is no priority habitat. OHV use will be managed as identified in the area-designations above.	In priority habitat, limit motorized travel to existing roads, primitive roads, and trails at a minimum, until such time as travel management planning is complete and routes are either designated or closed.	Same as Alternative B.	Priority habitat areas that do not have designated routes in a Travel Management Plan would be managed at least as limited to existing routes (i.e., could maintain existing OHV closures) until a Travel Management Plan designates routes. Priority habitat areas that have undergone Travel Management Planning with route designation would be managed at least as limited to designated routes (i.e., could maintain existing OHV closures). In these areas, existing route designations would be reviewed and adjusted where impacts to GRSG from route presence or use may exist.	Priority habitat areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be managed at least as limited to existing routes (i.e., could maintain existing OHV closures) until a Travel Management Plan designates routes. Priority habitat areas with nesting and winter habitat that have undergone Travel Management Planning with route designation would be managed at least as limited to designated routes (i.e., could maintain existing OHV closures). In these areas, existing route designations would be reviewed and adjusted where impacts to GRSG from route presence or use may exist.
Under current management there is no designated priority habitat. No similar action. Under current policy, the need for permanent or seasonal road closures is evaluated during travel management planning.	In priority habitat, travel management should evaluate the need for permanent or seasonal road or area closures.	No similar action.	No similar action.	No similar action.
Consider route and trail modifications (new or existing) on a case-by-case basis. Identify travel management areas and prioritize travel management planning in	Complete activity level plans within five years of the record of decision. During activity level planning, where appropriate, designate routes in priority habitat with current administrative/agency purpose or need to	Same as Alternative B.	Complete transportation plans in accordance with National BLM Travel Management guidance, requiring the BLM to maintain a current action plan and planning schedule to most effectively target available resources.	Counties should adopt and enforce travel management plans that include consideration for greater sage-grouse.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
areas where it would provide the most resource benefit.	administrative access only.		The following GRSG population areas are Utah's top priority areas to designate comprehensive travel plans: • Sheeprocks GRSG population area • Bald Hills GRSG population area • Box Elder GRSG population area • Rich GRSG population area • Ibapah GRSG population area • Hamlin Valley GRSG population area	
Under current management there is no designated priority habitat. Consider route and trail modifications (new or existing) on a case-by-case basis using the designation criteria.	In priority habitat, limit route construction to realignments of existing designated routes if that realignment has a minimal impact on sage-grouse habitat, eliminates the need to construct a new road, or is necessary for motorist safety.	Limit route construction to realignments of existing designated routes if that realignment has a minimal impact on sage-grouse habitat, eliminates the need to construct a new road, or is necessary for motorist safety. Mitigate any impacts with to offset the loss of GRSG habitat.	Travel systems would be managed with an emphasis on improving the sustainability of the travel network in a comprehensive manner to minimize impacts to GRSG, maintain motorist safety, and prevent unauthorized cross country travel while meeting access needs. To do so, it may be necessary to improve portions of existing routes, close existing routes or create new routes that meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning within priority habitat would be placed on having a neutral or positive effect on sage grouse habitat.	No similar action.
No similar action. Allow upgrades to existing roads on a case-by-case basis subject to site-specific environmental review.	In priority habitat, allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on sage-grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road.	Allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless it is necessary for motorist safety, or eliminates the need to construct a new road. Any impacts shall be mitigated with methods that have been demonstrated to be effective to offset the loss of GRSG habitat.	No similar action.	No similar action.
All LUPs include management actions that encourage the administrating agency to follow best management practices that reduce or minimize the impacts of development, including use of existing roads where possible.	In priority habitat, use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3 % for that area, then make additional, effective mitigation necessary to	Same as Alternative B using a 4-mile buffer to determine road route. Prohibit new road construction within 4 miles of occupied GRSG leks, and avoid new road construction in occupied GRSG habitat.	Same as Alternative B, except apply a 5% disturbance ceiling (rather than a 3%) and plan for new routes in consideration of larger transportation network objectives and needs.	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
	offset the resulting loss of GRSG habitat.			
No similar action. The need for restoration of linear disturbances (unauthorized routes) is identified during the implementation level travel management process or on a case-by-case basis.	In priority habitat, conduct restoration of roads, primitive roads and trails not designated in travel management plans. This also includes primitive route/roads that were not designated in Wilderness Study Areas and within lands with wilderness characteristics that have been selected for protection.	Same as Alternative B.	In priority habitat, conduct restoration of roads, primitive roads and trails not designated for motorized or non-motorized travel in travel management plans.	No similar action.
When reseeding roads, primitive roads and trails use appropriate seed mixes and consider the use of transplanted sagebrush.	When reseeding roads, primitive roads and trails in priority habitat, use appropriate seed mixes and consider the use of transplanted sagebrush.	When reseeding closed roads, primitive roads and trails, use appropriate native seed mixes and require the use of transplanted sagebrush.	Same as Alternative B.	No similar action.
No similar action.	No similar action.	No similar action.	No similar action.	Develop an educational process to advise OHV users of the potential for conflict with GRSG.
Recreation and Visitor Services				
Consider SRPs on a case-by-case basis. Consider measures that will minimize impacts to important resources or resource values.	Only allow special recreation permits (SRPs) (BLM) or recreation special use permits (FS) in priority habitat that have neutral or beneficial effects to priority habitat areas.	Only allow special recreation permits that have demonstrated neutral or beneficial affects to occupied habitat areas.	Same as Alternative B.	Limit or ameliorate impacts from recreation activities through the use of the following stipulations: • New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. • No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. • New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. • A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. • Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise) • Avoid activities (construction, vehicle noise, etc.) in the following seasons and habitats: o On leks from Feb 15 – May 15 to avoid activities that will disturb lek
No similar action.	No similar action.	No similar action.	Evaluate existing SRPs for adverse effects to GRSG and their habitat. Modify or cancel the permit, as appropriate, to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival). Identify permit stipulations that require the permittee to implement any necessary habitat restoration activities after SRP events. Restoration activities must be consistent with GRSG habitat objectives as determined by the BLM field office in collaboration with UDWR.	

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
				attendance or breeding. o In nesting and brood-rearing areas from Apr 1 – Aug 15. o In winter habitat from Nov 15 – Mar 15. o Specific time and distance determinations for seasonal stipulations would be based on site-specific conditions, in coordination with the local UDWR biologist. • Avoid disturbance within priority habitat (nesting and brood-rearing areas, winter habitat, other habitat), if possible. Project proponents must demonstrate why avoidance is not possible. • If avoidance in priority habitat is not possible, minimize as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation). • After minimization, mitigation is required (see mitigation section). • Cumulative new permanent disturbance should not exceed 5% of surface area of nesting, winter, or other habitat, within the population area's priority habitat. • Manage priority habitat to avoid barriers to migration, if applicable.
No similar action.	No similar action.	Seasonally prohibit camping and other non-motorized recreation within 4 miles of occupied GRSG leks.	No similar action.	No similar action.
Livestock Grazing				
Continue to make GRSG habitat available for livestock grazing. Active AUMs for livestock grazing would be 329,521 on BLM lands and 265,373 on FS lands, though the number of AUMs on a permit may be adjusted during site-specific evaluations conducted during	No similar action.	Alt C1: Make occupied GRSG habitat unavailable to livestock grazing for the life of the plan. Alt C2: Within allotments that overlap occupied GRSG habitat, reduce permitted AUMs by 131,808 permitted	Continue to make GRSG priority and general habitat available for livestock grazing. Active AUMs for livestock grazing would be 329,521 on BLM lands and 265,373 on FS lands, though the number of AUMs on a permit may be adjusted during site-specific evaluations	Continue to make GRSG priority and general habitat available for livestock grazing. Active AUMs for livestock grazing would be 329,521 on BLM lands and 265,373 on FS lands. Existing grazing operations would utilize recognized rangeland best management

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
term permit renewals, Allotment Management Plan (AMP) development, or other appropriate implementation activity. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, season of use, and other aspects of grazing within the terms and conditions of the permit based on the permittees livestock operation and/or an evaluation of a variety of forage and resource site-specific conditions.		This would result in a reduction of up to 329,521 permitted AUMs on BLM lands and 265,373 permitted AUMs on FS lands (if all allotments witih any overlap with GRSG habitat were closed in their entirety; closing just the portions of allotments within GRSG habitats, if possible, could reduce this number).	AUMs on BLM lands and 106,149 permitted AUMs on FS lands. Reductions by allotment will occur by Field Office based on a review of the site-specific information (e.g., range condition, utilization levels, type and condition of GRSG habitat). Based on the Field Office review, the reductions in AUMs would occur in allotments that overlap occupied GRSG habitat, whether partial reductions in active use or closing specific allotments. The reductions would be implemented during renewal of term grazing permits. The resulting AUMs available for permitting for livestock grazing would be 197,713 on BLM lands and 159,224 on FS lands.	conducted during term permit renewals, Allotment Management Plan (AMP) development, or other appropriate implementation activity. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, season of use, and other aspects of grazing within the terms and conditions of the permit based on the permittees livestock operation and/or an evaluation of a variety of forage and resource site-specific conditions.	practices to increase the necessary vegetation, and thereby increase the potential for nesting success and population recruitment Should site-specific concerns be raised about the effect of grazing upon GRSG habitat, and such effects are documented over a sufficiently long time-frame, corrective management actions should be addressed through the application of best management practices, including consideration of those identified by the Department of Agriculture and Food's Grazing Improvement Program.
No similar action.	Within priority GRSG habitat, incorporate GRSG habitat objectives and management considerations into all BLM and FS grazing allotments through AMPs or permit renewals and/or FS Annual Operating Instructions.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	Same as Alternative B.	No similar action.
Consider adjustments to allotment boundaries that provide for single unit or landscape level grazing approaches to habitat improvement on a case-by-case basis.	In priority habitat, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/BLM and/or FS allotments can be planned as single units.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	In priority habitat, consult, cooperate, and coordinate with other land owners and management agencies (e.g., private, SITLA) to develop plans which provide for single unit or landscape level approaches to habitat improvement. In priority habitat with unfenced private and SITLA lands within a grazing allotment that are under exchange of	No similar action.

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
				use agreements or percent public land use, manage the allotment as a single unit that will have the same management as the public lands.	
Manage rangeland resources to maintain healthy, sustainable, rangeland ecosystems and to restore degraded rangelands in accordance with Utah's Standards for Rangeland Health or standards or guidelines established in individual Forest Service LRMPs. Standard 3 requires that desired species including native, threatened, endangered, and special status species are maintained at a level appropriate for the site and species as indicated by: a) Frequency, diversity, density, age class, and productivity of desired native species necessary to ensure reproductive capability and survival. b) Habitats connected at a level to enhance species survival. c) Native species reoccupy habitat niches and voids caused by disturbances unless management objectives call for introduction or maintenance of nonnative species. d) Habitats for threatened, endangered, and special status species managed to provide for recovery and move species toward de-listing. e) Appropriate amount, type, and distribution of vegetation reflecting the presence of 1) the DPC, where identified in a land use plan conforming to these Standards, or 2) where the DPC is not identified, a community that sustains the desired level of productivity and properly functioning ecological processes. Complete rangeland health assessments for each allotment at least once every ten years for consideration during the permit renewal process.	Prioritize completion of land health assessments (FS may use other analyses) and processing grazing permits within priority GRSG habitat areas. Focus this process on allotments that have the best opportunities for conserving, enhancing or restoring habitat for GRSG. Utilize BLM Ecological Site Descriptions (ESDs) (or comparable FS methods) to conduct land health assessments to determine if standards of range-land health are being met.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	Evaluate Utah's Rangeland Health Standards (RHS) (FS may use other analyses) and process grazing permits within priority GRSG habitat areas. Focus management activities on allotments found not to be achieving RHS and that have the best opportunities for conserving, enhancing or restoring habitat for GRSG. When completing land health assessments, incorporate appropriate indicators and protocols to assess the condition of GRSG habitat considering the objectives (e.g., percent cover and height of sagebrush, grasses, forbs, other shrubs, etc.) (Doherty et al. 2011). Use ESDs or USFS equivalent and/or other appropriate information, including GRSG habitat objectives, as the basis to determine DPC or other community within proper functioning ecological processes for conducting land health assessments to evaluate the achievement or non-achievement of rangeland health standards.	No similar action.

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
Monitor vegetation trends (including composition, cover, and age class), noxious weeds, riparian Proper Functioning Condition (PFC), etc. as part of the grazing management program. BLM plans do not contain grazing management decisions specific to conserving sage-grouse habitat. Forest Service LUPs contain specific management actions for permitted livestock grazing that take in to consideration established habitat management objectives.					
No similar action.	In priority habitat, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	Within priority habitat where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description, maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing, winter, and transition areas. Desired cover percentages and heights for sagebrush, grasses, and forbs in seasonal habitats will follow habitat guidelines from scientific literature (e.g., Connelly et al. 2000, Hagen et al. 2007). Adjustments from the guidelines may be made, but must be based on documented regional variation of habitat characteristics (e.g., sagebrush type, ecological site potential), quantitative data from population and habitat monitoring, and evaluation of local research.	No similar action.
No similar action.	Develop specific objectives to conserve, enhance or restore priority GRSG habitat based on ESDs (or comparable FS methods) and assessments (including within wetlands and riparian areas). If an effective grazing system that meets GRSG habitat requirements is not already in place, analyze at least one alternative that conserves, restores or enhances GRSG habitat in the NEPA document prepared for the permit renewal.	Alt C1: No similar action.	Alt C2: No similar action.	Same as Alternative B.	Consider GRSG seasonal habitat requirements when managing sagebrush rangelands. Considerations to be taken into account include the following: Leks • Be cautious of man-made structures on lek sites. • Reduce shrub encroachment and maintain the "open" area that characterizes a typical lek site. • Identify the location of leks through discussions with DWR biologists.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
					Nesting/Early Brood-Rearing • Maintain and enhance the existing sagebrush/plant communities. • Manage these areas to increase herbaceous cover by sustaining a mosaic of sagebrush and open areas. • Avoid repeated, annual heavy use of these areas by implementing periodic rest and/or deferment periods during the critical growing season. Late Brood-Rearing • Avoid continuous (season-long) grazing of wet meadows and riparian habitats, especially under drought conditions when temperatures are high. Winter • Carefully manage levels of browsing or activities in sagebrush areas that constitute GRSG habitat that would reduce GRSG access to these areas for food and cover. • The potential impact of livestock grazing on winter habitat can be positive or negative depending on scale and location of use
Consider changes to season of use on a case-by-case basis when resource conditions indicate that a change is needed.	No similar action.	Alt C1: No similar action.	Alt C2: Within GRSG habitat, change season of use so that no grazing occurs during the growing season. Based on sub-regional climate variations, growing season will be determined on a permit-by-permit basis.	No similar action.	No similar action.
Consider range improvements and/or adjust permit terms and conditions on a case-by-case basis as necessary to meet land health standards or habitat objectives identified in	In priority habitat, manage for vegetation composition and structure consistent with ecological site potential and within the reference state to achieve GRSG seasonal	Alt C1: No similar action.	Alt C2: In occupied GRSG habitat, manage for vegetation composition	In priority GRSG habitat, manage for vegetation composition and structure consistent with the objectives for GRSG seasonal habitats, as described above.	Address incompatible grazing strategies through established rangeland management practices consistent with the maintenance or enhancement of habitat.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
individual LUPs. Changes may include, but are not limited to: 1) Rotation systems (e.g., rest rotation, deferred rotation); 2) Season or timing of use; 3) Distribution of livestock use; 5) Type of livestock; 6) Class of livestock; 7) Duration of grazing use and rest periods.	habitat objectives. Implement management actions (grazing decisions, Annual Operating Instructions [FS only], AMP/Conservation Plan development, or other agreements) to modify grazing management to meet seasonal GRSG habitat requirements. Consider singly, or in combination, changes in: 1) Season or timing of use; 2) Numbers of livestock (includes temporary non-use or livestock removal); 3) Distribution of livestock use; 4) Intensity of use; and 5) Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats).		and structure consistent with ecological site potential and within the reference state to achieve GRSG habitat objectives. Implement management actions (grazing decisions, AMP/Conservation Plan development, or other plans or agreements) to modify grazing management to meet seasonal sage-grouse habitat requirements. Consider singly, or in combination, changes in: 1) Season, timing, and/or frequency of livestock use; 2) Numbers/AUMs of livestock (includes temporary non-use or livestock removal); 3) Distribution of livestock use; 4) Intensity of livestock use; and 5) Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats).	Develop and implement the terms and conditions needed to meet these objectives through the permit renewal process or other appropriate implementation action. In general habitat and opportunity areas, consider GRSG habitat objectives when making livestock grazing decisions. As necessary to meet land health standards and objectives for priority GRSG habitat, implement management actions (e.g., AMP, term permit renewals, grazing decisions, other agreements) to modify grazing management to meet seasonal GRSG habitat objectives, as outlined above. Consider singly, or in combination, changes in the following: 1) Rotation systems (e.g., rest rotation, deferred rotation); 2) Season or timing of use; 3) Distribution of livestock use; 4) Intensity of use (e.g., objectives for utilization or stubble height); 5) Type of livestock (e.g., cattle, sheep, horses, and goats), unless such a change conflicts with other species management; 6) Class of livestock (e.g., yearlings vs. cow-calf pairs) 7) Duration of grazing use and rest periods	Carefully manage the "time," "timing," and "intensity" of grazing in sagebrush/GRSG habitats to provide for the seasonal needs of GRSG. Specific prescriptions can be applied through more intensive management to address special needs or weak links in the biological year of GRSG production. Where time controlled grazing is not an option, moderate use of occupied GRSG habitats will usually leave mosaic or patchy areas where some plants are ungrazed. Managing for moderate utilization levels (40%) after the period of rapid vegetation growth may provide enough residual cover for GRSG nesting and early brood-rearing the subsequent spring. Evaluation of GRSG nesting and escape cover must be determined on a site-specific basis. Livestock operations with a small amount of nesting habitat should consider special management activities to protect nesting and early brood-rearing areas. Lighter use of areas may be warranted. In areas with large tracts of contiguous habitat, livestock producers should manage the vegetation on a rotational grazing basis, which may leave 10 - 20 percent of the area ungrazed periodically in combination with deferring or altering timing of grazing in other areas. In areas where GRSG nesting is common, managing for moderate use of plant growth across the landscape would be appropriate. Well-managed ranches with comprehensive grazing strategies that include short-term or duration grazing, higher levels of use may be acceptable, provided these higher levels of use include rested vegetation in nearby areas.
No similar action. Livestock grazing program/policy direction allows the BLM to	During drought periods, prioritize evaluating effects of the drought in priority GRSG	Alt C1: No similar action.	Alt C2: During drought	During drought periods, prioritize evaluating effects of the drought in priority GRSG	No similar action.

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
make changes to livestock grazing in response to drought conditions. Changes may include adjusting livestock numbers based on available forage or shortening the season of use.	habitat areas relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought, ensure that post-drought management allows for vegetation recovery that meets GRSG needs in priority GRSG habitat areas.		periods, prioritize evaluating effects of drought in sage-grouse habitat areas relative to their biological needs, as well as drought effects on ungrazed reference areas. Since there is a lag in vegetation recovery following drought (Thurow and Taylor 1999; Cagney et al. 2010), ensure that post-drought management allows for vegetation recovery that meets sage-grouse needs in sage-grouse habitat areas based on GRSG habitat objectives.	habitat areas relative to their needs for food and cover. Initiate emergency management measures (e.g. delaying turnout, adjusting the amount and/or duration of livestock grazing, implement other terms of the permit) during times of drought to protect sage grouse habitat. Implement post-drought management to allow for vegetation recovery that meets GRSG needs in priority GRSG habitat areas.	
Manage, maintain, protect, and restore riparian and wetland areas to the proper functioning condition (PFC).	Manage riparian areas and wet meadows for proper functioning condition (FS: or other similar methodology) within priority GRSG habitats.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	Same as Alternative A.	Design water developments to enhance mesic habitat for use by GRSG and maintain adequate vegetation in wet meadows. Within priority habitat, GRSG stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.
Manage, maintain, protect, and restore riparian and wetland areas to the proper functioning condition (PFC).	Within priority and general GRSG habitats, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge to minimize elevated mortality during the late brood rearing period.	Alt C1: No similar action.	Alt C2: Within GRSG habitats, manage wet meadows to maintain a component of perennial forbs with diverse species richness and productivity relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase	Same as Alternative B.	Design water developments to enhance mesic habitat for use by GRSG and maintain adequate vegetation in wet meadows. Within priority habitat, GRSG stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
			the amount of edge and cover within that edge to minimize elevated mortality during the late brood-rearing period.		
No similar action.	Where riparian areas and wet meadows meet proper functioning condition (FS – or meet standards using other similar methodology), strive to attain reference state vegetation relative to the ecological site description.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	No similar action.	Design water developments to enhance mesic habitat for use by GRSG and maintain adequate vegetation in wet meadows. Within priority habitat, GRSG stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.
Manage rangeland resources to maintain healthy, sustainable, rangeland ecosystems and to restore degraded rangelands in accordance with Utah's Standards for Rangeland Health or standards or guidelines established in individual Forest Service LRMPs. Rangeland health standards require that riparian areas be managed for PFC.	Within priority GRSG habitat, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in the hot season (summer).	Alt C1: No similar action.	Alt C2: No similar action.	Within priority GRSG habitat and opportunity areas, assess livestock grazing in riparian and meadow complexes and ensure recovery or maintenance of appropriate vegetation and water quality. Where recovery or maintenance is not occurring and the causal factor is livestock grazing, reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer by adjusting grazing management practices (e.g., use fencing/herding techniques, or changes in seasonal use or livestock distribution). Consider applying the same to general habitat.	Continue livestock grazing strategies that have proven effective in maintaining and enhancing GRSG habitat, unless compelling and credible cause-and-effect evidence indicates a disturbance exists. Address incompatible grazing strategies through established rangeland management practices consistent with the maintenance or enhancement of habitat. Design water developments to enhance mesic habitat for use by GRSG and maintain adequate vegetation in wet meadows. Within priority habitat, GRSG stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.
Consider authorization of new water developments on a case-by-case basis taking into consideration impacts to other resources and resource values.	Authorize new water development for diversion from spring or seep source only when priority GRSG habitat would benefit from the development. This includes developing new water sources for livestock as part of an AMP/conservation plan to improve GRSG habitat.	Alt C1: No similar action.	Alt C2: Authorize no new water developments for diversion from spring or seep sources within sage-grouse habitat~~.~~	Limit authorization of new water developments within GRSG priority habitat to projects that would have a neutral effect or be beneficial to priority GRSG habitat (such as by shifting livestock use away from critical areas). New developments that divert surface water must be designed to maintain continuity of predevelopment riparian or wet meadow vegetation and hydrology.	Design water developments to enhance mesic habitat for use by GRSG and maintain adequate vegetation in wet meadows. Within priority habitat, GRSG stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.
Consider modifications to existing water developments on a case-by-case basis taking into consideration impacts to other resources.	Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within priority GRSG habitats. Make modifications where	Alt C1: No similar action.	Alt C2: Analyze springs, seeps and associated water developments to determine if	Within priority GRSG habitat evaluate existing water developments (springs, seeps, etc and their associated pipelines) to determine if modifications are necessary to maintain or improve riparian areas and	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
	necessary, considering impacts to other water uses when such considerations are neutral or beneficial to GRSG.		modifications are necessary to maintain the continuity of the predevelopment riparian area within sage-grouse habitats. Make modifications where necessary, including dismantling water.	GRSG habitat. Make modifications where necessary, considering impacts to other water uses when such considerations are neutral or beneficial to GRSG.	
Allow treatments that provide benefits for multiple resources. Additional forage will be appropriate to livestock, wild horses and burros (where applicable), and wildlife.	In priority habitat, only allow treatments that conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).	Alt C1: No similar action.	Alt C2: Ensure that vegetation creates landscape patterns which most benefit sage-grouse. Only allow treatments that are demonstrated to benefit GRSG and retain sagebrush height and cover consistent with GRSG habitat objectives (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve sage-grouse habitat).	In priority habitat, ensure that vegetation and rangeland treatments conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock). Do not authorize treatments that have a negative effect on meeting GRSG habitat objectives.	No similar action.
Most LUPs do not include specific management actions related to seedings. Plans do include generic decisions that allow maintenance of existing range improvements, which includes maintenance of historical seedings. Recently completed LUPs promote use of native species when conducting restoration activities. This would include restoration projects conducted in areas that have perennial grass cover. Older plans do not include a similar management action.	Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to priority GRSG habitats to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an AMP/ Conservation Plan or if they provide value in conserving or enhancing the rest of the priority habitats, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments.	Alt C1: No similar action.	Alt C2: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to sage-grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for sage-grouse. If these seedings provide value in conserving or enhancing GRSG	Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to priority-sage-grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for sage-grouse. If these provide value in conserving or enhancing GRSG habitats, then no restoration would be necessary. Assess the compatibility of these seedings for sage-grouse habitat during the land health assessments.	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
			habitat~~s~~, then no restoration would be necessary. Assess the compatibility of these seedings for sage-grouse habitat during the land health assessments.		
Consider structural range improvements on a case-by-case basis to provide for livestock grazing while maintaining rangeland health.	In priority habitat, design any new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattleguards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.	<u>Alt C1:</u> No similar action.	<u>Alt C2:</u> Avoid all new structural range developments and location of supplements (salt or protein blocks) in occupied GRSG habitat unless independent peer-reviewed studies show that the range improvement structure or nutrient supplement placement benefits GRSG. Structural range developments, in this context, include but are not limited to cattleguards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning	In priority habitat, design any new structural range improvements to conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattleguards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.	Locate livestock fences away from leks and employ the NRCS fence standards (see NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes.")

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
			process and monitored and treated post-construction. Consider the comparative cost of changing grazing management instead of constructing additional range developments.		
No similar action.	When developing or modifying water developments in priority habitat, use applicable best management practices (BMPs, see NTT Appendix C) to mitigate potential impacts from West Nile virus.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	When developing or modifying water developments in priority habitat, use applicable best management practices and best available science to mitigate potential impacts from West Nile virus.	No similar action.
Consider modifications to existing structural range improvements on a case-by-case basis taking into consideration impacts to other resources.	In priority habitat, evaluate existing structural range improvements and location of supplements (salt or protein blocks) to make sure they conserve, enhance or restore GRSG habitat.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	In priority habitat, evaluate and assess the need to modify existing improvements to make sure they are neutral, conserve, enhance, or restore GRSG habitat.	No similar action.
No similar action.	To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within priority GRSG habitat based on proximity to lek, lek size, and topography.	Alt C1: No similar action.	Alt C2: Remove, modify or mark fences in areas of moderate or high risk of GRSG strikes within sage-grouse habitat based on proximity to lek, lek size, and topography.	Same as Alternative B.	Fences should not be located on or adjacent to leks where bird collisions would be expected to occur. Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes").
Implement noxious weed and invasive species control using integrated weed management actions per national guidance and local weed management plans in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners.	In priority habitat, monitor for, and treat invasive species associated with existing range improvements.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	In priority habitat, monitor for and treat noxious weeds and evaluate the need to treat invasive species associated with existing range improvements.	Aggressively respond to new infestations to keeping invasive species from spreading. Every effort should be made to identify and treat new infestations before they become larger problems. Additionally containment of known infestations in or near sagebrush habitats should be a high priority for all land management agencies.
No similar action.	Maintain retirement of grazing privileges as an option in priority GRSG areas when the current permittee is willing to retire grazing on all or part of an allotment. Analyze the adverse impacts of no livestock use on wildfire and invasive species threats in evaluating retirement proposals.	Alt C1: No similar action.	Alt C2: Same as Alternative B.	When grazing permits are offered for relinquishment, which authorize grazing within priority GRSG habitat, use the relinquished AUMs to implement improved grazing management practices that will enhance and restore GRSG habitat. Analyze the effects of decreased or discontinued grazing on GRSG habitat conditions,	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C		Alternative D	Alternative E1
				possible changes in wildfire and invasive species risks, and the socioeconomics of the area.	
No similar action.	No similar action.	Alt C1: No similar action.	Alt C2: Establish and maintain sufficiently large areas free of livestock as reference areas to aid in describing ecological site potential and as a measure of the comparative effects of livestock grazing—and relief from livestock grazing—on GRSG populations.	No similar action.	No similar action.
No similar action.	No similar action.	Alt C1: No similar action.	Alt C2: Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition, establish non-grazing exclosures, and include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Continue monitoring for five years after livestock are returned to the area, and compare to treated, ungrazed exclosures, as well as untreated areas.	No similar action.	No similar action.
Wild Horses and Burros					
Manage wild horse and burro population levels within established Appropriate Management Levels (AML) to ensure a balance among wild horses, wildlife, livestock, and other resources.	Manage wild horse and burro population levels within established Appropriate Management Levels (AML).	Alt C1: Same as Alternative B.	Alt C2: Associated with the 25% reduction of livestock grazing, reduce wild horse AML by 25%. While the use	Same as Alternative B.	Same as Alternative A.

Table 2-2 – Description of Alternatives A, B, C$_1$, C$_2$, D, and E$_1$

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
		could still occur every year (as opposed to the rest system of once every 4 years for livestock grazing), this would result in a similar reduction in grazing pressure on vegetation in priority GRSG habitat.		
Prioritize wild horse/burro gathers based on monitoring data.	Prioritize wild horse/burro gathers in priority GRSG habitat, unless removals are necessary in other areas to prevent catastrophic environmental issues, including herd health impacts.	Same as Alternative B.	Same as Alternative B.	Same as Alternative A.
Prepare or amend herd management area plans on an as needed basis	Within priority habitat, develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all BLM herd management areas (HMAs).	Same as Alternative B.	No similar action.	Same as Alternative A.
Periodically evaluate and make adjustments to AMLs based on monitoring data.	For all HMAs within priority GRSG habitat, prioritize the evaluation of all AMLs based on indicators that address structure/condition/composition of vegetation and measurements specific to achieving GRSG habitat objectives.	No similar action.	Same as Alternative B.	Same as Alternative A.
No similar action.	Coordinate with other resources (Range, Wildlife, and Riparian) to conduct land health assessments to determine existing structure/condition/composition of vegetation within all BLM HMAs.	Same as Alternative B.	No similar action.	No similar action.
No similar action.	When conducting NEPA analysis for wild horse/burro management activities, water developments or other rangeland improvements for wild horses in priority GRSG habitat, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock identified above in priority habitats.	Same as Alternative B.	When considering wild horse/burro management activities, water developments or other rangeland improvements for wild horses in priority GRSG habitat, use the criteria identified for domestic livestock in priority habitats.	No similar action.
Areas of Critical Environmental Concern (ACECs)				
No existing ACECs include sage-grouse as a	No similar action.	Designate and manage the following 15	No similar action.	No similar action.

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
relevant and important value.		areas (2,233,800) as ACECs (BLM) and GRSG Zoological Areas (FS) to function as sagebrush reserves to conserve GRSG: • Three Corners/Browns Park o **Total acres – 72,600** o BLM acres – 50,100 o FS acres – 22,500 • Diamond Mountain o **Total acres – 139,500** o BLM acres – 110,300 o FS acres – 29,200 • Little Mountain/Halfway Hollow o **Total acres – 74,900** o BLM acres – 60,700 o FS acres – 14,200 • Blue Mountain o **Total acres – 18,900** o BLM acres – 18,900 o FS acres – 0 • Emery o **Total acres – 11,500** o BLM acres – 0 o FS acres – 11,500 • Parker Mountain o **Total acres – 350,500** o BLM acres – 201,800 o FS acres – 148,700 • Southern Mountain Valleys o **Total acres – 171,300** o BLM acres – 105,300 o FS acres – 66,000 • Buckskin Valley o **Total acres – 46,000** o BLM acres – 34,900 o FS acres – 11,100 • Black Mountains o **Total acres – 256,800** o BLM acres – 256,800 o FS acres – 0 • Southern Great Basin o **Total acres – 101,000** o BLM acres – 101,000 o FS acres – 0 • Sheep Creek Mountains		

Table 2-2 – Description of Alternatives A, B, C_1, C_2, D, and E_1

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E1
		o **Total acres – 398,100** o BLM acres – 316,700 o FS acres – 81,400 • Ibapah o **Total acres – 47,000** o BLM acres – 47,000 o FS acres – 0 • Box Elder/Grouse Creek o **Total acres – 364,100** o BLM acres – 364,100 o FS acres – none in planning area • Rich County o **Total acres – 171,800** o BLM acres – 166,600 o FS acres – 5,200 • Strawberry o **Total acres – 9,800** o BLM acres – 0 o FS acres – 9,800		
No similar action.	No similar action.	Manage the relevant and important values for the 15 GRSG ACECs/GRSG Zoological Areas as identified above. In addition, implement the following management for these areas: • Manage the GRSG ACECs/Zoological Areas to minimize anthropogenic disturbances to GRSG, consistent with valid existing rights. • Prioritize withdrawal from mineral location in the ACECs/Zoological Areas. Make any existing claims within the ACECs/Zoological Areas subject to validity patent examinations. • Require Plans of Operations for any Notice level locatable mineral per 43 CFR 3809 regulations. • Prioritize the removal of infrastructure (including unneeded mining or ROW equipment, roads, range developments and fencing).	No similar action.	No similar action.

BLM Greater Sage-Grouse Planning Proposed Alternatives Summary Table

Idaho and Southwestern Montana Sub-Regional Greater Sage-Grouse Planning Strategy EIS	**BLM Field Offices/ Forest Service Forest Addressed**	*BLM Idaho*: Birds of Prey NCA; Bruneau FO; Challis FO; Craters of the Moon NM; Four Rivers FO; Jarbidge FO; Salmon FO; Owyhee FO; Pocatello FO; Shoshone FO; Burley FO; Upper Snake FO *BLM Montana:* Dillon FO *Forest Service Idaho:* Boise National Forest; Salmon-Challis National Forest; Targhee, Curlew National Grasslands; Caribou National Forest; Sawtooth (including a small portion in Utah) *Forest Service Montana:* Beaverhead-Deerlodge National Forest

Range of alternatives considered with a brief summary of what they address.

	Alternative A No Action	**Alternative B**	**Alternative C**	**Alternative D**	**Alternative E**	**Alternative F**
Source, Origination and Scope:	Compilation of all existing plans in occupied habitat for both BLM and FS.	NTT Report applied to BLM and Forest Service occupied habitat.	Environmental Citizen Group based alternative + NTT Report 'Plus' applied to all BLM and FS occupied habitat and potentially other areas.	Sub-Regional alternative applies to BLM and FS occupied habitat in Idaho, Montana and Utah. Montana BLM/FS will continue current management direction with additional management actions responding to issues and NTT consistency.	State Alternative for BLM and FS occupied habitat in Idaho and Utah portion of Sawtooth NF. Composed of Idaho and Utah Governor's alternative. No Governor's Alternative in Montana; however, existing management was developed through coordination between BLM/FS and Montana Fish Wildlife and Parks.	Environmental Citizen Groups based alternative + NTT Report 'Plus' for BLM and FS occupied habitat.
Habitat Categorization	No delineation of occupied sage-grouse habitat.	Occupied sage-grouse habitat is categorized into Priority Habitat and General Habitat areas as described in the April 2012 map, with associated management.	All occupied habitat is managed similarly.	Occupied habitat is categorized into three delineations in Idaho (Core, Priority and General), and two in Montana and Utah (Priority and General), with associated management.	*Idaho*: Occupied habitat is categorized into three delineations (Core, Important and General) with associated management. *Montana and Utah:* Occupied habitat is categorized into two delineations (Priority and General); with associated management.	All occupied habitat is categorized into Priority and General areas, with potentially other areas, each with associated management.

Fire Management and Wildfire	Continue to manage under current guidance.	Prioritize Suppression immediately after life and property. Fuels Management projects to reduce fine fuels, including targeted grazing. Implement fuel breaks to protect sagebrush. Prioritize native seed allocation to sage-grouse habitat areas. Maintain 15% canopy cover post fuels treatment. Adjust management activities to support successful restoration post rehabilitation.	Manage vegetation for good or better ecological condition. Focus fuel breaks on areas of human habitation or significant disturbances.	Same as Alt. B, in addition: Preposition initial attack resources to higher fire occurrence areas. Use knowledgeable Resource Advisors on extended attack fire, and train fire fighters regarding sagebrush management during fire suppression activities. Ensure long term persistence of seeded or pre-burn native plants. Use chemical, mechanical, and seeding treatments with appropriate plant materials to stabilize sites and prevent dominance of invasive, annual vegetation, and noxious weeds. Use native plant materials were appropriate and practicable. Use the warmer adapted variety of a species range when reseeding following fire to address potential climate change.	Incorporate BLM IM-2011-138 to reduce the number and size of wildfires in sage-grouse habitat including: Develop state-specific sage-grouse localized maps for use in prioritizing suppression. Preposition initial attack resources to higher fire occurrence areas. Use knowledgeable Resource Advisors on extended attack fire, and train fire fighters regarding sagebrush management during fire suppression activities. Design fuel treatments to protect existing sagebrush ecosystems. **Core and Important Areas**: Prioritize suppression in sage-grouse habitats immediately after human safety and structure protection. Interagency coordination, including mutual aid agreements. Create and maintain effective fuel breaks in strategic locations. **Core Areas**: Evaluate and decrease wildfire response time by 25% Evaluate the current fire suppression baseline and	Mow grass within fire breaks. Exclude livestock from burned areas until woody and herbaceous vegetation meet sage-grouse habitat objectives. Construct and utilize livestock exclosures to monitor fire restoration progress.

					develop a consistent plan that improves on this baseline by 25%. Add additional initial attack resources and pre-position resources to the West Owyhee Conservation Area. **Important Areas:** Evaluate and decrease wildfire response time by 20% in the West Owyhee Conservation Area. Decrease wildfire response time in all other conservation areas by 15%. Evaluate the current fire suppression baseline and develop a consistent plan that improves on this baseline by 15%. **General Areas:** Emphasize fire suppression efforts, recognizing other local, regional and national fire suppression priorities. Use livestock to reduce fine fuels and maintain fuel breaks where appropriate. Reduce human caused fires, with additional prevention programs. Develop more aggressive fuels reduction strategies.	

Invasive Species	Continue to treat invasive species as directed under current policy. Existing Coordinated Weed Management Areas and management remain without adjustment. Wash all fire fighting vehicles prior to deployment.	Same as No Action.	Wash project vehicles when leaving infested areas. Treat infested areas focusing on mechanical treatment before the use of herbicides. Do not graze infested areas until native vegetation is restored. Quarantine livestock before entering public lands when coming from infested areas.	Same as No Action.	**All Habitat Areas:** Wash all fire fighting vehicles prior to deployment. **Core Areas**: Manage to prevent invasion. Actively manage exotic undesirable species sufficient to prevent invasion into other management zones. **Core and Important Areas**: Monitor and treat invasives for at least 3 years following fire. **Important Areas**: Manage to treat infestations without impairing sage-grouse populations. Actively pursue eradication or control of invasives that threaten sage-grouse habitat. **Important and General Areas:** Establish an effective monitoring system to determine effectiveness of treatment. Actively manage exotic undesirable species sufficient to prevent invasion into other management areas. **General Areas:** Employ aggressive measures in cooperation with CWMAs. Aggressively pursue eradication or control of invasives that pose a risk to sage-grouse habitat.	Restrict activities that spread invasives. Treat invasives after fire in sagebrush habitat. Ensure that soil and plants are at Ecological Potential in sage-grouse habitat to reduce vulnerability of invasion.

Infrastructure	Continue to manage existing and proposed infrastructure projects and rights-of-way under current guidance.	No new authorizations in Priority habitat unless development occurs within existing developed footprint.	No new ROW authorizations unless development occurs within existing developed footprint.	Core, Priority and General areas designated as ROW avoidance areas. Exlcude development of larger (>50kV) transmission facilities, wind testing and development, solar development, commercial geothermal development, nuclear development, oil and gas development, airports, paved roads, graded gravel roads, and landfills, in Core areas.	Core and Important areas identified as ROW avoidance areas. Core areas – no new infrastructure except for in place upgrades. Important areas – new infrastructure can be authorized if specific criteria are met.	Same as Alternative A.
Habitat Restoration and Vegetation Management	Continue to manage under current guidance.	Prioritize restoration efforts based on the likelihood of success and considering Connelly 2000 and Hagen 2007. Reestablishment of sagebrush cover is highest priority.	Same as Alternative B and reestablish sagebrush cover on exotic seedings, and do not remove sagebrush cover in order to improve forage production.	Utilize Habitat Assessment Protocols and Rangeland Health Assessments to determine habitat quality and priorities. Utilize best available tools for restoration efforts. Protect priority sage-grouse habitat from fire through strategic wildfire suppression planning. Planning measures may include: strategically placed fire resistant vegetation or green-strip seedings; strategically placed pre-treated areas that reduce fine fuels through mowing vegetation along roadsides, grazing strategies, herbicide application, etc.; pre-planning of wildfire suppression tactics in important sage-grouse habitat; prioritizing suppression of wildfire in priority habitats; conducting burn-out/backfiring operations in a manner that minimizes the loss of sagebrush.	Same as Alternative A	Same as Alternative C.

Leased Fluid Minerals	Continue to manage under current guidance.	No surface occupancy (NSO) within priority habitat. Limit disturbance to 3% and apply a 4 mile NSO buffer around leks if lease is entirely within priority habitat. Conservation measures would be applied. Applies to split estate as well.	Same as Alternative B.	Limit future lease disturbance to 3% (1 drill pad per section) in Core areas. Prohibit surface activities on future leases within a buffer around leks in Priority areas.	State Director may authorize oil and gas development if provisions are made in Core Areas. In Important Areas development is allowed on future leases if it will not cause a decline in sage-grouse populations.	Same as Alternative A.
Unleased Fluid Minerals	Continue to manage under current guidance.	Close priority areas to leasing. Upon expiration of existing leases in priority areas do not accept expressions of interest. Allow geophysical exploration in priority areas only to acquire data for areas outside and adjacent to priority areas, using helicopter drill rigs with timing stipulations.	Same as Alternative B and no exploration permits allowed.	Close Core and Priority areas outside the Bear Lake Plateau to leasing and no exploration permits allowed. Allow exploration in priority areas for areas adjacent to priority areas with timing stipulations. General areas are open to leasing and exploration with timing stipulations near leks.	Same as Alternative A.	Same as Alternative C.
Non-Energy Leasable Minerals (New Leases)	Continue to manage under current guidance.	No new leases in priority habitat.	Same as Alternative B.	Close Core areas to leasing outside of Known Lease Areas. Consider leases within Core Areas in Known Lease Areas on a case-by-case basis. Consider new leases on a case-by-case basis in Priority areas. Allow new leases with stipulations in General areas.	Same as Alternative A.	Same as Alternative B.

Non-Energy Leasable Minerals (Existing Leases)	Continue to manage under current guidance.	Follow Required Design Features (RDF) for solid and fluid minerals.	Same as Alternative B.	In Core and Priority areas follow required design features and best management practices (BMP) and require habitat rehabilitation or off-site mitigation if rehabilitation is not feasible. In General areas require BMPs as conditions of approval for the mine plan.	Same as Alternative A.	Same as Alternative B.
Locatable Minerals	Continue to manage under current guidance.	Propose to withdraw all priority areas from mineral entry. Existing claims would be subject to buyout or validity examination. Make RDFs mandatory conditions of approval in priority areas.	No new mining claims allowed. Make RDFs mandatory conditions of approval in priority areas.	Same as Alternative B, in addition withdraw Core areas from mineral entry and close valid claims and require additional mitigation for sage-grouse habitat. Apply BMPs to priority and general areas as mandatory stipulations in Plans of Operation.	Same as Alternative A.	Same As Alternative C.
Saleable Minerals	Continue to manage under current guidance.	Close priority areas to mineral materials. Restore mineral material permit areas to sage-grouse habitat if no longer needed as a material source.	Same as Alternative B.	Same as Alternative B, in addition close Core areas to mineral materials and apply timing stipulations and BMPs to permits in priority areas.	Same as Alternative A.	Same as Alternative B.
Coal	Continue to manage under current guidance.	Identify all priority areas as unsuitable as set forth in 43 CFR 3461.5. No new leases in priority areas unless all surface disturbance occurs outside priority habitat. Locate mining operation	Same as Alternative B.	Same as Alternative B.	Same as Alternative A.	Same as Alternative B, and abate wastewater to reduce risk of West Nile virus.

		facilities outside of priority areas or within the footprint of existing facilities. Minimize surface disturbing activities in General areas.				
Recreation and Visitor Services	Continue to manage under current guidance.	In priority areas only permit special uses that are neutral or beneficial to sage-grouse.	Same as Alternative B.	No sage-grouse hunting permits will be approved in Core or Priority areas. All other applications will be analyzed with the goal of minimizing impacts. Minimize adverse recreation effects to sage-grouse in Recreation Management Areas.	Core and Important Areas: Prioritize Travel Planning to minimize impacts to sage-grouse and reduce the risk of wildfire. Restrict motorized use to existing routes prior to travel planning. Apply timing and seasonal restrictions on activities which demonstrate disturbance of nesting sage-grouse.	Same as Alternative B, and apply seasonal camping closures within 4 miles of active leks.
Livestock Grazing	Continue to manage under current guidance.	Incorporate sage-grouse habitat objectives into grazing permits and Allotment Management Plans in priority areas. Use integrated ranch planning in priority areas to plan grazing on all ownerships. Prioritize completion of land (range) health assessments and grazing permit NEPA analyses on allotments in priority areas with the most potential for conserving sage-grouse. Develop sage-grouse	No authorized grazing within occupied sage-grouse habitat. No new water developments in sage-grouse habitat. No new structural range improvements. Retirement of grazing would be allowed and fast tracked. Any vegetation treatments must have pre-treatment data recorded, be monitored for 3 years	Same as Alternative B; in addition: Manage riparian areas, lentic areas and wet meadows to move toward PFC in Core and Priority areas. Consider retiring grazing in Core and Priority areas.	**Core and Important Areas:** Prioritize allotments for permit renewal where populations are declining. Add sage-grouse guidelines into management plans as desired conditions, recognizing livestock grazing may not always be a causal factor in non-attainment. Prioritize completion of land (range) health assessments and grazing permit NEPA analysis on allotments in priority areas with declining sage-grouse populations. Allotment assessments will be use published characteristics of	Same as Alternative B; in addition: Reduce authorized grazing within occupied sage-grouse habitat. Maintain at least 6 inch stubble height of all species at all times in wet meadows. No new water developments in sage-grouse habitat. Avoid all new

		objectives for allotment management and analyze an alternative in permit renewal NEPA that conserves or enhances sage-grouse habitat. Implement changes to grazing management needed to meet seasonal sage-grouse requirements. During drought change grazing management as necessary to attain sage-grouse objectives. Manage riparian areas within priority areas to attain Proper Functioning Condition (PFC). Manage wet meadows in priority and general areas to maintain forbs to facilitate brood rearing needs. Authorize only new water developments in priority areas that are beneficial to sage-grouse. In priority areas only authorize treatments that benefit sage-grouse. Evaluate exotic grass seedings to determine their values for sage-grouse and manage for	after treatment.		sage-grouse habitat and comply with 43 CFR 4180.2(c). Allotment management changes must be tailored to address specific problems. Change grazing management only when monitoring indicates sage-grouse objectives are not being met. Management changes, when needed, must be tailored to specifically address habitat objectives that need improvement. **Core Areas**: Altering grazing schemes in allotments, where needed and appropriate, may be facilitated by enhanced grazing opportunities with introduced seedings or areas with lower value to sage-grouse (i.e. General areas). The unintended consequences of altering grazing use, such as possible increased risk of wildfire, must be carefully considered in any management proposal.	structural range improvements and supplement locations in occupied habitat. Any vegetation treatments must have pre-treatment data recorded; must be monitored for 3 years after treatment with no grazing and monitored for 5 years after grazing resumes.

		sage-grouse objectives. Design new structural range improvements and supplement locations to conserve sage-grouse. Evaluate existing range improvements in priority areas and design to conserve sage-grouse. Mark or remove fences that present a high risk for strikes by sage-grouse. Maintain the option to retire grazing use in priority areas on an opportunity basis. Identify those allotments where retirement of grazing would benefit sage-grouse.				
Areas of Critical Environmental Concern	Maintain designation of 53 existing ACECs containing 325k of occupied sage-grouse habitat.	Same as Alternative A.	Designate 39 new ACECs encompassing approximately 4.2 million acres of occupied sage-grouse habitat.	Same as Alternative A.	Same as Alternative A.	Designate 17 new ACECs encompassing 11.5 million acres of occupied sage-grouse habitat; or designate 18 new ACECs encompassing 3.01 million acres of occupied sage-grouse habitat..

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Thursday, March 19, 2015 4:39 PM
To: Fetter, Rob
CC: ICF_SGSE
Subject: Re: BLM SGSE - NMV appendices for sage grouse analysis

Categories: (none)

Thanks Rob. I've passed this information along and will let you know as soon as I hear back.

Josh

On Thursday, March 19, 2015, Fetter, Rob<Rob.Fetter@icfi.com>wrote:

> Josh,
>
> Following up on our conversations this week, I spoke internally with ICF team members and wanted to give you an update. We understand BLM is interested in whether ICF could support the development of documents that would provide informationabout non-market values related to EISs to support sage grouse habitat conservation. The specifications, as we understand them, are as follows:
>
> - Use the framework we created for other sage-grouse EISs (e.g. NW Colorado) to assess non-market values associated with recreation, also documenting the scientific/economic principles of non-market valuation generally
>
> - The geographic scope would include all of the Rocky Mountain EISs (WY, ND, SD, and the remainder of MT not covered by the ID / SWMT EIS).
>
> - Because the analysis would focus on recreational value, and there are few or no quantitative predictions of changes in recreational activity across the alternatives for those EISs, the analysis would focus primarily or perhapsexclusively on baseline assessment (within a defined recent time period, e.g., 2008-2012)
>
> - For each EIS, deliverables would comprise a Word document of a few pages, plus the summary excel tables (to facilitate BLM doing additional manipulations it deems necessary)
>
> - BLM would need draft deliverables completed by approximately April 6, and there would be round of review and revision between approximately April 6 and approximately April 30.
>
> Note that ICF would need BLM to provide recreation data for the desired years from the BLM RMIS system (Report 26, I believe). We would also use data from the FS NVUM system, which is publicly available online (in addition to data on non-marketvaluation from the work of John Loomis, and others).

> We think this would fit within the scope of the current Task Order (it is closely related to the cumulative analysis), but would require a contract modification.
>
> Please let me know if you have any questions or want to talk about this further.
>
> Thanks,
>
> Rob
>
> **Please Note New Phone Number:**
>
> **T. ROBERT FETTER**|Program Manager&Environmental Economist |949.233.3042 (m)|rob.fetter@icfi.com|icfi.com
>
> **ICF INTERNATIONAL**| 8310 S. Valley Highway, Suite 240, Englewood, CO 80112

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Josh Sidon
Branch Chief Planning and Assessment (Acting)
BLM Colorado State Office
303-239-3936

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From: Miller, Chris J -FS [chrismiller@fs.fed.us]
Sent: Tuesday, February 24, 2015 11:25 AM
To: Uriarte, Alex; jsuhrpierce@blm.gov
Subject: RE: BLM SGSE - Proposed Plan Socioeconomic Data Requests

Alex, Julie,

Sounds good – the net benefits discussion could be of particular importance, if there are increases in adverse impacts to any of the particular sectors under proposed plans.

Let me know when requests are finalized, and I'll send them out.

Thanks,
Chris

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Tuesday, February 24, 2015 12:08 PM
To: Miller, Chris J -FS; Lauren Mermejo; Julie Suhr Pierce; Stewart Allen; Joshua Sidon
Cc: Fetter, Rob; Johnson, Laura
Subject: RE: BLM SGSE - Proposed Plan Socioeconomic Data Requests

Thanks, Chris. I will bring up your examples, as we move forward in discussions with resource specialists. I would also like to discuss your thoughts on language for net benefits, maybe after ICF has had a chance to see the proposed plans as well (we haven't seen them yet, but I expect to see the Utah one tomorrow).

If you could forward the data requests to FS staff and copy me and Laura Johnson (copied here), I would appreciate it.

Thanks,

Alex

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Connect with us on social media.

From: Miller, Chris J -FS [mailto:chrismiller@fs.fed.us]
Sent: Tuesday, February 24, 2015 1:52 PM
To: Uriarte, Alex; Lauren Mermejo; Julie Suhr Pierce; Stewart Allen; Joshua Sidon
Cc: Fetter, Rob
Subject: RE: BLM SGSE - Proposed Plan Socioeconomic Data Requests

Alex,

If you feel specialists need more details regarding the question about 'how impacts from the proposed plan differ from …remaining alternatives', then you could add:

> "For example, could changes in habitat designations (e.g., specification of sagebrush focus areas), seasonal habitat desired conditions, compensatory mitigation, or adaptive management trigger responses under the proposed plan have impacts on current/future permit holders that differ substantially from other alternatives?"

Not related to the information requests – but given that we included a section in the DEIS about the efficiency of the overall decision in providing net sage grouse benefits – there may be a need to include new language about how the proposed plans provide for greater efficiency (hopefully?) and potential for net sage grouse benefits. This type of discussion would not need to be quantitative or highly complex – however, it still seems we need to add some qualitative language that differentiates the proposed plan from other alternatives. I don't have an immediate suggestion about who would be the best specialists/leads to engage on this.

I have a list of FS folks to send requests to - I can provide that to you, or let me know if you want me to send it out. BTW – recreation is not much of a perceived issue, so FS no longer has a rec specialist on the GRSG team.

Chris

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Tuesday, February 24, 2015 4:54 AM
To: Lauren Mermejo; Julie Suhr Pierce; Stewart Allen; Miller, Chris J -FS; Joshua Sidon
Cc: Johnson, Laura; Fetter, Rob; ICF_SGSE
Subject: RE: BLM SGSE - Proposed Plan Socioeconomic Data Requests

Lauren,

I attached revised data requests for NVCA, removing references to an Alternative G. This was the only sub-region where we were making such reference. The data requests for the remaining sub-regions remain the same. Please feel free to distribute to the resource specialists as soon as you find appropriate. I would also appreciate if you could let us know by when we can expect to receive input from the resource specialists. Ideally, we would have at least a week after receiving input from the resource specialists to clarify any questions we may have, insert the analysis in our own write-ups, QC and deliver to you. If this is not possible, at least a few days would be appreciated.

Julie, I understand you will be forwarding the data requests for Utah to Quincy Bahr and for ID/MT to Jonathan Beck, is that correct? Would you also let me know by when we can expect input from the resource specialists?

Stewart, would you be able to forward the data requests for Oregon to Joan Suther? If you could also let me know by when we could expect to receive input from the resource specialists, I would appreciate.

Thanks,

Alex

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From: Lauren Mermejo [mailto:lmermejo@blm.gov]
Sent: Friday, February 20, 2015 7:36 PM
To: Uriarte, Alex; Julie Suhr Pierce; Stewart Allen; Miller, Chris J -FS; Joshua Sidon
Cc: Johnson, Laura; Fetter, Rob; ICF_SGSE
Subject: RE: BLM SGSE - Proposed Plan Socioeconomic Data Requests

Thanks for sending this Alex – may I make one request for all plans in the Great Basin Region. None of the four plans refer to the Proposed Plan as Alternative G.....it is just the "Proposed Plan". I think that sending out a request for Alternative G will be confusing, so if you could change your data requests at the bottom of each write-up to refer to only the Proposed Plan before we distribute, that would be great.
Thank you and Happy Weekend.
Lauren

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Friday, February 20, 2015 4:19 PM
To: Julie Suhr Pierce (jsuhrpierce@blm.gov); Allen, Stewart; Miller, Chris J -FS (chrismiller@fs.fed.us); Lauren Mermejo (lmermejo@blm.gov); Sidon, Joshua B (jsidon@blm.gov)
Cc: Johnson, Laura; Fetter, Rob; ICF_SGSE
Subject: BLM SGSE - Proposed Plan Socioeconomic Data Requests

Julie, Stewart, Chris,

Please find attached requests for input from resource specialists for the socioeconomic analysis of potential impacts from the proposed plans for the four sub-regional EISs of the Great Basin region. The data requests are in four folders, one for each sub-region.

I would appreciate if you could take a quick look and let me know if you have any comments or suggestions for modifications. Per Lauren's suggestion, I will then forward these requests to the sub-regional leads, copying you:

Lauren Mermejo and Randy Sharp for NV/CA
Jonathan Beck for ID/MT
Quincy Bahr for Utah
Joan Suther for Oregon

Chris, please let me know if there is anyone else you think I should forward these to at the FS.

Josh, I will be sending you similar data requests for NWCO early next week. If you take a look at the attached data requests and feel we need to change the way they are presented, please do let me know.

Lauren, as promised, I am sending these data requests today to you as well, but I would appreciate if we would wait until early next week to distribute to the resource specialist, in case Julie, Stewart, Josh or Chris suggest changes.

Please note the following:

- We included in each data request the names of those who previously provided input for the socioeconomic analysis of the remaining alternatives.
- In addition, the data requests for NV/CA, ID/MT and Utah are also directed to Julie Suhr Pierce and the data requests for Oregon are also directed to Stewart Allen, under the understanding that Julie and Stewart will be able to help communicate our data needs with the various resource specialists, if needed. I am also available to interact directly with the resources specialists, as needed.
- We have also directed all the grazing data requests to Chris Miller and Dustin Bambrough for their input. Chris, please feel free look at the other data requests for NV/CA, ID/MT and Utah, in case you feel FS input is needed (e.g, recreation, wind energy).
- Because of the short time we will have to coordinate with resource specialists, we included as much information possible on the current socioeconomic impact analysis of the remaining alternatives to give resource specialists as much background as possible on how the requested data will be used, relative to the other alternatives analyzed
- We have not yet seen the proposed plans. We may have additional questions to resource specialists when the proposed plans become available to us.

Thank you. Please feel free to contact me if you have any questions or concerns,

Alex

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From: Sidon, Joshua [jsidon@blm.gov]
Sent: Wednesday, June 4, 2014 3:59 PM
To: Uriarte, Alex
CC: Kurz, Elizabeth; ICF_SGSE
Subject: Re: BLM SGSE - Questions for resources specialists in Idaho and Nevada
Attachments: Impacts from Management of Locatable Minerals (DEIS socioecon).docx

Hi Alex,

I have emailed these questions to the appropriate specialists with the exception of the mineral questions for NV. I'm concerned that the first question repeated below is not totally accurate and, most importantly, does not provide enough context or ask a specific enough question for the specialists to respond to.

- *The DEIS socioeconomics section states that production of gold, silver and copper would remain the same across alternatives despite increased withdrawals in GRSG habitat and restrictions and design features imposed by action alternatives. Comments to the Nevada/California GRSG DEIS request further detail be provided on how this conclusion was reached. We would appreciate your help in developing the reasoning behind this conclusion or in revising it.*

The socioeconomics section states, "BLM specialists generally expect that the production of gold, silver, and copper would remain the same across all alternatives (BLM 2013g), **at least in the first three to five years** after any withdrawal from locatable mineral entry is implemented." This is the case for only those alternatives that are proposing withdraws. The first sentence in the summary of comments in the comment analysis report for locatables says, "Economic impacts analysis under Alt B, C, D, E, and F is inadequate and misleading - no quantitative or "even semi-quantitative analysis" was completed. Description of management alternatives reveals "substantial" differences with respect to locatable minerals across alternatives."

I think the comments on the socioeconomics impact analysis related to locatable minerals were some of the more substantive comments, and I really want to ensure we adequately address them. My recommendation is start by attaching the current, revised language included in the socioeconomics impact section for locatable minerals (I've attached it here). Then revise the question as follows:

- *Comments to the Nevada/California GRSG DEIS request further detail on the economic impacts from management of locatable minerals. Generally the comments on the current analysis can be summarized as follows:* ***Economic impacts analysis under Alt B, C, D, E, and F is inadequate and misleading - no quantitative or "even semi-quantitative analysis" was completed. Description of management alternatives reveals "substantial" differences with respect to locatable minerals across alternatives."*** *For your reference, attached is the current impact discussion that we developed for the EIS. As you are aware, a quantitative analysis is not possible because neither an RFD or minerals potential report were developed for locatable minerals for this planning*

> *effort. We would appreciate your help in developing a more defensible rationale/justification for the current qualitative economic analysis or help revising it by provide more specific information (quantitative or other) on potential impacts to locatable minerals under the different alternatives.*

What do you think? Thanks.

Josh

On Thu, May 29, 2014 at 6:37 PM, Uriarte, Alex <Alex.Uriarte@icfi.com> wrote:

> Josh,
>
> Please find below our questions for BLM resources specialists in Idaho and Nevada. I am to discuss, if you'd like.
>
> Thanks,
>
> Alex
>
> 1. Question for Idaho minerals specialist, Karen Porter
>
> Comments to the Idaho GRSG DEIS request discussion of socioeconomic impacts of the of alternatives on phosphate mining. Our understanding from the DEIS minerals section is that:
>
> - Of the 86 federal phosphate leases that BLM administers in Idaho, only ten are located in GRSG habitat. None of these leases have had active mining operations on them, nor is any mining planned on the leases in the next 5 to 10 years;
>
> - Demand for phosphate remains high, and the companies that mine in southeast Idaho continue to develop new mines as old ones are reclaimed and remediated.

- Tables 4-64 through 4-67 show considerable acreage of unleased areas closed to future or subject to NSO, CSU or TL stipulations, particularly under Alternatives B, C and D.

Is there any way to estimate the potential impact of alternatives on future phosphate based on the impacts to both leased and unleased areas? If no quantitative estimate is possible, are there relative magnitudes (comparing one alternative to another) of the impacts of alternatives on production that can be discussed?

2. Question for Nevada grazing specialist, Mike Tietmeyer

Comments to the Nevada/California GRSG DEIS state that the DEIS erroneously assumed the difference between active and billed (actual) AUMs is controlled by the permittee. They argue that reasons for the difference between active an billed AUMs include "regulations, grazing restrictions, fire and drought closures, vacant allotments, economic market conditions, etc." We would appreciate assistance in better understanding the reasons behind observed differences in active and billed AUMs and the extent to which permittees may adjust billed AUMs in response to restrictions on active AUMS.

3. Question for Nevada lands and realty specialist, Dan Ryan.

Comments to the Nevada/California GRSG DEIS express concern with the requirement for burying new and existing power lines and the impact of associated costs on energy consumers. Please clarify whether the management action recommending burying new and existing power lines: a) applies to transmission or distribution lines; b) applies to all action alternatives. Please also clarify what share of new and existing lines would this requirement be expected to apply to under each alternative, if possible.

4. Question for Nevada recreation and travel management specialists, Barbara Keleher and Leo Drumm

Comments to the Nevada/California GRSG DEIS dispute the DEIS statements in the socioeconomics section that suggest restrictions to OHV use would not alter overall recreational use of BLM and FS lands in the affected area. The statements in the DEIS socioeconomics section point to input from BLM recreation specialists as support to this conclusion. How can we better support this statement? If this statement is not correct, do we have enough information to provide an approximate estimate of potential reductions in recreational use of BLM and FS lands?

5. Questions for Nevada minerals specialists, Scott Murrelwright, Stuart Grange and John Menghini

a) The DEIS socioeconomics section states that production of gold, silver and copper would remain the same across alternatives despite increased withdrawals in GRSG habitat and restrictions and design features imposed by action alternatives. Comments to the Nevada/California GRSG DEIS request further detail be provided on how this conclusion was reached. We would appreciate your help in developing the reasoning behind this conclusion or in revising it.

b) To what extent are the impacts on the production of locatable minerals largely in the counties of Elko, Lander, Eureka and White Pine? Could you provide information on the cities and counties, within Nevada, where companies that provide inputs and services to the mining industry are typically located?

c) Comments to the Nevada/California DEIS question whether the impacts to fluid minerals will be the same under Alternatives A, C, D and E, given the existence of differences among the alternatives with respect to leasing and winter habitat NSOs. We would appreciate your assistance in further supporting this conclusion of revising it.

d) Could you provide information on the cities and counties, within Nevada, where that provide inputs and services to the oil and gas sector are typically located? Are the impacts of management alternatives on oil and gas production largely restricted to the counties of Elko, Eureka, White Pine, Nye and Lincoln?

6. Question for Nevada wind energy specialist

Comments to the Nevada/California GRSG DEIS request further analysis of the local, regional and national socioeconomic impact of effects of GRSG management alternatives on wind energy. The current DEIS analysis states that future installation of wind energy capacity would be expected to be reduced under all alternatives compared to Alternative A but that no quantification of impacts is currently possible. Is there more detail that we can provide regarding relative magnitude of impacts or rationale behind the current conclusion?

7. Question for Nevada fuels specialist

Comments to the Nevada/California GRSG DEIS suggest removal of livestock grazing would expand fire fuels and promote larger and more costly fires with impacts to local economies. We would appreciate your input on:

> a) Whether removal of livestock grazing could in fact expand the risk of fires;
>
> b) Independent of your answer to item “a” above, what can we expect would be the impacts alternatives on the risk of wildfires and their relative magnitude, and what is the rationale and evidence behind the expected impacts.
>
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Impacts from Management of Locatable Minerals

As described in **Chapter 3**, the study area produces several locatable minerals, including gold, silver and copper. GRSG habitat management alternatives would impose restrictions on development of mineral production, particularly under Alternatives B, C and F, under which some lands would be petitioned for withdrawal from locatable mineral entry (see **Section 4.13**, Minerals – Locatable).

Any entity that holds valid existing rights to locatable mineral development would not be affected by a withdrawal of lands from locatable mineral entry because the valid existing right would supersede a withdrawal if it occurs. **Section 4.13**, Minerals – Locatable, provides more information about valid existing rights; also, see the definition of valid existing rights in **Chapter 8**, Acronyms and Glossary. For areas without a valid existing right, if an area is withdrawn for locatable mineral entry, an applicant wishing to stake a claim would be required to pay for a mineral examination to determine if the claim is valid, based on geological potential and expected economic viability. The applicant would pay the cost of the mineral examination. This would hinder exploration or claim activity for some operators and some claims, depending on the size of the claim, expected return on investment, and the operator's ability to invest capital upfront in the process. However, because all of this information is site-specific, it is not possible to determine the specific economic impacts of the petition for withdrawal under Alternatives B and F.

Commented [JBS1]: Should this include Alt C?

BLM specialists generally expect that the production of gold, silver, and copper would remain the same across all alternatives (BLM 2013g), at least in the first three to five years after any withdrawal from locatable mineral entry is implemented. In the long run, production of locatable minerals would be affected only to the degree that the cost of conducting a mineral examination would affect individual operators' decisions to pursue claim, which would depend on site-specific and operator-specific conditions.

Overall, economic activity associated with management of locatable minerals would be the same for Alternatives A, D, and E, and may be lower under Alternatives B, C and F depending on site-specific and operator-specific conditions.

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Friday, June 13, 2014 1:21 PM
To: Uriarte, Alex
Subject: Re: BLM SGSE - Should I contact Jessica Montag for oil and gas data?

Yes, you can contact Jessica for Wyoming and Dakotas. Please cc me on any email. Thanks,

Josh

On Friday, June 13, 2014, Uriarte, Alex <Alex.Uriarte@icfi.com> wrote:

> Josh, you had mentioned I work with Julie if I needed any additional information from resource specialists. I think all I need right now is some help getting oil and gas production estimates by alternatives in the Wyoming, Montana and Dakota sage grouse EISs. I assume I should contact Jessica Montag for that. Is that correct? Please let me know, I am happy to do so.
>
> Thanks,
>
> Alex
>
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From: Sidon, Joshua [jsidon@blm.gov]
Sent: Wednesday, October 1, 2014 2:22 PM
To: Uriarte, Alex
CC: ICF_SGSE
Subject: Re: BLM SGSE - Touching base

Hey Alex,

Thank you for touching base.

While it did not result in a major change in the results, I do think the revised cumulative oil & gas impact method makes more sense. Our next step will be to check in with NW CO.

I have received some unofficial information on schedule that indicates that it might be pushed back significantly. Below is what I have heard

February 2015 - Draft Proposed Plans/FEISs come to the Washington Office for review
May 2015 - Publish Proposed Plans/FEIS
June 2015 - End of 30 day Protest Period
August 2015 - RODs signed

Again, this is unofficial and it is confidential. In light of this information, I have really slowed down. I don't want to burn through your budget any more at this point, and I don't want to gather information from specialists that might change.

With that in mind, I'll communicate updates with you as it gets communicated to me.

I have finished commenting and editing on the ID revisions based on public comments (I made some substantial changes to the phosphate discussion and added some language to the powerline discussion). I am still waiting to get feedback on recreation. Also, as noted in a previous email thread, there is a chance that the AUM numbers might change. I'm hesitant to send the comments along because of these pending issues. What do you think? Would it be efficient for you have our comments to date and start addressing those now? Let me know.

Thanks again for your patience Alex!

Josh

On Wed, Oct 1, 2014 at 9:14 AM, Uriarte, Alex <Alex.Uriarte@icfi.com> wrote:

> Hi, Josh,

> We haven't communicated in a couple of weeks. I calculated the cumulative oil and gas of the GRSG management alternatives across the 10 state sage-grouse range as a share of projected oil and gas production for the 10 states, as we had discussed. I used EIA projections for the lower 48 states as a whole, since projections were not available by state. The results are only slightly lower than what we had before (see first tab of attached spreadsheet). If production were expected to grow much more in the 10 states than in the 48 as a whole, the result could be different, but I don't think we have those projections (at least I couldn't find any on the websites of the WOGCC and the COGCC).
>
> Let me know if you want to touch base. Any news on schedule? Any news on the information we were seeking on the proposed plans? Do you think it would be useful for me to try to pursue some of the information we need on the proposed plans directly with other resource specialists, maybe copying you?
>
> Please let me know.
>
> Thanks,
>
> Alex
>
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From: Sidon, Joshua [jsidon@blm.gov]
Sent: Tuesday, February 24, 2015 7:33 AM
To: Uriarte, Alex
CC: Martin Hensley
Subject: Re: Do you have some time to discuss the NWCO O&G RFD?
Attachments: Socioeconomic_Analysis_Fluid_Minerals_MASTER_revised.xlsx

Do you have a revised file similar to the one attached (the attached file contains the old RFD data)?

Josh

On Mon, Feb 23, 2015 at 4:28 PM, Uriarte, Alex <Alex.Uriarte@icfi.com> wrote:

> That time works, thanks. I believe the documents you sent are the latest ones. The latest input we received on the oil and gas RFD was the email exchange between you and Erin from September 17.
>
> Alex
>
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> **From:** Sidon, Joshua [mailto:jsidon@blm.gov]
> **Sent:** Monday, February 23, 2015 4:43 PM
> **To:** Uriarte, Alex
> **Cc:** Martin Hensley
> **Subject:** Re: Do you have some time to discuss the NWCO O&G RFD?
>
> How about 9am MT? I'll call you because I'm going to have Martin join us.
>
> I'm trying figure out where we left off. I'm attaching the revised RFD from NWCO and the (cumulative) summary you put together. Is there another that you have that summarizes the NWCO RDF and impacts under each alternative?

Josh

On Mon, Feb 23, 2015 at 2:34 PM, Uriarte, Alex <Alex.Uriarte@icfi.com> wrote:

Sure. Can it be tomorrow morning? I can give you a call.

Alex

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From: Sidon, Joshua [mailto:jsidon@blm.gov]
Sent: Monday, February 23, 2015 4:05 PM
To: Uriarte, Alex
Subject: Do you have some time to discuss the NWCO O&G RFD?

Let me know.

Josh

--

Josh Sidon

Branch Chief Planning and Assessment (Acting)

BLM Colorado State Office

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Summary of data in this workbook

(ICF summary of data provided by NWCO sub-region; 3/11/2014)

BCF gas, fed only		**GJFO**	**GJFO shale**	**WRFO**	**LSFO**	**KFO**	**CRVFO**	**Roan Plateau**	**Total**
	2009	38	173	88	170	0	123	79	672
	2010	53	255	120	332	0	169	109	1,038
	2011	62	314	141	486	0	199	128	1,330
	2012	69	361	157	632	0	221	142	1,582
	2013	74	402	170	771	0	238	154	1,809
	2014	79	438	180	903	0	253	163	2,016
	2015	83	470	190	1,028	0	267	172	2,211
	2016	87	501	199	1,147	0	280	180	2,394
	2017	91	528	207	1,260	0	291	188	2,566
	2018	94	554	215	1,368	0	302	195	2,728
	2019	97	577	222	1,470	0	312	201	2,880
	2020	100	599	229	1,566	0	321	207	3,022
	2021	103	619	235	1,659	0	330	212	3,157
	2022	105	637	240	1,746	0	337	217	3,283
	2023	108	654	245	1,829	0	344	222	3,402
	2024	110	669	250	1,908	0	351	226	3,514
	2025	111	683	254	1,983	0	357	230	3,619
	2026	113	697	258	2,054	0	362	234	3,718
	2027	115	709	261	2,122	0	368	237	3,811
	2028	116	720	265	2,186	0	372	240	3,899
Total		1,811	10,558	4,126	26,621	0	5,799	3,736	52,650

MBO oil, fed only		**GJFO**	**GJFO shale**	**WRFO**	**LSFO**	**KFO**	**CRVFO**	**Roan Plateau**	**Total**
	2009	38	0	88	9	4	123	79	341
	2010	53	0	120	17	8	169	109	475
	2011	62	0	141	24	11	199	128	566
	2012	69	0	157	32	15	221	142	635
	2013	74	0	170	39	18	238	154	693
	2014	79	0	180	45	21	253	163	742
	2015	83	0	190	51	24	267	172	788
	2016	87	0	199	57	27	280	180	831
	2017	91	0	207	63	29	291	188	870
	2018	94	0	215	68	32	302	195	907
	2019	97	0	222	73	34	312	201	941
	2020	100	0	229	78	37	321	207	972
	2021	103	0	235	83	39	330	212	1,001
	2022	105	0	240	87	41	337	217	1,028
	2023	108	0	245	91	43	344	222	1,053
	2024	110	0	250	95	45	351	226	1,076
	2025	111	0	254	99	46	357	230	1,098

	2026	113	0	258	103	48	362	234	1,118
	2027	115	0	261	106	50	368	237	1,136
	2028	116	0	265	109	51	372	240	1,153
Total		1,811	0	4,126	1,331	622	5,799	3,736	17,424

Federal:	**GJFO**	**GJFO shale**	**WRFO**	**LSFO**	**KFO**	**CRVFO**	**Roan Plateau**	**Total**
Wells drilled	1,660	2,108	3,780	1,776	177	5,318	3,411	18,230
Wells completed	1,577	2,003	3,600	142	168	5,060	3,240	15,790
% completed	95%	95%	95%	8%	95%	95%	95%	87%

Federal, state and fee:								
Wells drilled	5,220	3,614	4,620	3,031	330	14,318	5,880	37,013
Wells completed	4,959	3,433	4,380	2,424	313	13,600	5,585	34,694
% completed	95%	95%	95%	80%	95%	95%	95%	94%

Avg production per completed well (note: this will most likely be an underestimate, bc the actual calculati

Gas (federal), BCF	1.148	5.271	1.146	187.470	0.000	1.146	1.153	3.334
Oil (federal), MBO	1.148	0.000	1.146	9.373	3.703	1.146	1.153	1.103
Gas (fed-st-fee), BCF	1.146	5.290	1.146	18.716	0.000	1.146	1.145	2.773
Oil (fed-st-fee), MBO	1.146	0.000	1.146	0.936	3.691	1.146	1.145	1.041

Comparison for avg production (this is also inaccurate for the same reason as the figures above. But it pr

Buffalo RMP, federal only, base case

Conventional infill		per well
Completed wells	3672	
Production (Bcf gas)	331.423983	0.1
Production (MBO oil)	144607.538	39.4
CBG		
Completed wells	10258	
Production (Bcf gas)	2813.54	0.3

ONRR		BCF: fed, state, fee	GJFO	GJFO shale	WRFO	LSFO	KFO	CRVFO
244	0.362682	2009	121	297	107	290	0	331
251	0.242091	2010	166	438	146	566	0	454
290	0.217802	2011	195	540	172	828	0	534
320	0.202216	2012	216	622	191	1,077	0	593
		2013	234	692	206	1,314	0	641
		2014	248	753	219	1,539	0	681
		2015	262	809	231	1,752	0	718
		2016	274	861	242	1,955	0	752
		2017	286	909	252	2,148	0	783
		2018	296	952	262	2,331	0	812
		2019	306	993	270	2,504	0	839
		2020	315	1,030	278	2,670	0	863
		2021	323	1,064	285	2,827	0	886
		2022	331	1,096	292	2,976	0	907
		2023	338	1,124	298	3,117	0	926
		2024	344	1,151	304	3,252	0	943
		2025	350	1,176	309	3,380	0	959
		2026	355	1,198	314	3,501	0	974
		2027	360	1,219	318	3,616	0	988
		2028	365	1,238	322	3,726	0	1,000
		Total	5,684	18,159	5,020	45,368	0	15,586

MBO: fed, state, fee	GJFO	GJFO shale	WRFO	LSFO	KFO	CRVFO
2009	121	0	107	15	7	331
2010	166	0	146	28	14	454
2011	195	0	172	41	21	534
2012	216	0	191	54	27	593
2013	234	0	206	66	33	641
2014	248	0	219	77	39	681
2015	262	0	231	88	45	718
2016	274	0	242	98	50	752
2017	286	0	252	107	55	783
2018	296	0	262	117	59	812
2019	306	0	270	125	64	839
2020	315	0	278	133	68	863
2021	323	0	285	141	72	886
2022	331	0	292	149	76	907
2023	338	0	298	156	79	926
2024	344	0	304	163	83	943
2025	350	0	309	169	86	959

	2026	355	0	314	175	89	974
	2027	360	0	318	181	92	988
	2028	365	0	322	186	95	1,000
Total		5,684	0	5,020	2,268	1,155	15,586

on involves decline curves and not all wells "count" for 20 years. The last tab in this file provides mo

ovides some sort of check.)

			Jobs from gas production			
			Direct		Direct + Indirect + Induced	
Roan Plateau	**Total**		**Federal**	**Fed-st-fee**	**Federal**	**Fed-st-fee**
136	1,282		527	1,005	4,769	9,099
186	1,957		814	1,534	7,369	13,894
219	2,487		1,043	1,950	9,441	17,662
243	2,943		1,241	2,308	11,236	20,896
263	3,349		1,418	2,626	12,845	23,781
279	3,719		1,581	2,916	14,316	26,405
295	4,067		1,734	3,189	15,699	28,874
309	4,393		1,877	3,444	16,999	31,190
321	4,699		2,012	3,684	18,220	33,365
333	4,987		2,139	3,910	19,367	35,406
344	5,257		2,258	4,122	20,446	37,323
354	5,510		2,370	4,320	21,460	39,124
364	5,749		2,475	4,507	22,413	40,816
372	5,972		2,574	4,683	23,310	42,406
380	6,183		2,667	4,848	24,154	43,901
387	6,381		2,755	5,003	24,947	45,306
394	6,567		2,837	5,149	25,695	46,627
400	6,742		2,915	5,286	26,398	47,870
405	6,907		2,988	5,415	27,060	49,040
410	7,062		3,057	5,537	27,684	50,140
6,395	96,211	**average**	2,064	3,772	18,691	34,156

			Jobs from oil production			
			Direct		Direct + Indirect + Induced	
Roan Plateau	**Total**		**Federal**	**Fed-st-fee**	**Federal**	**Fed-st-fee**
136	716		6	13	54	113
186	995		8	17	75	158
219	1,182		10	21	89	187
243	1,325		11	23	101	210
263	1,443		12	25	110	228
279	1,544		13	27	117	244
295	1,638		14	29	125	259
309	1,725		15	30	131	273
321	1,805		15	32	138	286
333	1,879		16	33	143	297
344	1,948		16	34	149	308
354	2,012		17	35	154	318
364	2,071		17	36	158	328
372	2,126		18	37	163	336
380	2,177		18	38	167	344
387	2,223		19	39	170	352
394	2,267		19	40	174	359

400	2,307		20	40	177	365
405	2,345		20	41	180	371
410	2,379		20	42	183	376
6,395	36,108	**average**	15	32	138	286

Annual jobs (Base Case):

	Direct	**Direct, indirect, induced**
Federal	**12,140**	**37,226**
Fed, state, fee	**24,833**	**72,872**

re insight.)

NAICS code	**Colorado jobs in mining sector (from Census County Business Patterns)**	**Year 2011**
21----	Mining (total)	25,006
211---	Oil and gas extraction	6,692
212---	Mining (except oil and gas)	4,616
213---	Support activities for mining	13,698
213111	Drilling oil and gas wells	3,573
213112	Support activities for oil and gas operations	9,091
213113	Support activities for coal mining	145
213114	Support activities for metal mining	500-999
213115	Support activities for nonmetallic minerals mining	20-99

Oil and gas, including support activities 19,356

(compare to 24,833 jobs estimated per year from just new wells in NW Colorado)

Jobs from well drilling

	Direct		Direct + Indirect + Induced	
	Federal	**Fed-st-fee**	**Federal**	**Fed-st-fee**
20 yrs	128,922	261,755	238,710	484,661
avg / yr	6,446	13,088	11,935	24,233

Jobs from well completion

Direct		Direct + Indirect + Induced	
Federal	**Fed-st-fee**	**Federal**	**Fed-st-fee**

20 yrs	72,293	158,844	129,230	283,947
avg / yr	3,615	7,942	6,462	14,197

Year 2007
28,433
7,923
5,186
15,324
4,280
8,794
124
362
1000-2499
20,997

		Acres	Acres	Acres	%	%	%			
		O/G High Potential	O/G Medium Potential	O/G Low potential	O/G High	O/G Medium	O/G Low	Wells drilled- High	Wells drilled Medium	Wells Low
NW District Planning area										
Fee Oil and Gas (coal only and no minerals)		2,302,806	508,533	1,176,454						
Federal Oil and Gas (all minerals; oil and gas only, oil, gas, and coal only; other minerals; unknown)		4,865,666	1,100,808	3,847,679						
All Mineral Ownership		7,168,471	1,609,341	5,024,133						
<u>ADH Fee Oil and Gas</u> (coal only and no minerals)		629,535	239,285	664,189						
<u>ADH Federal Oil and Gas</u> (all minerals; oil and gas only, oil, ga		2,383,777	432,416	2,003,621						
PPH Fee Oil and Gas		506,217	57,235	121,584						
PPH Federal Oil and Gas		2,873,466	462,816	749,446						
WRFO Done										
Fee Oil and Gas (coal only and no minerals)		352,169	23,105	74,799	18%	21%	16%	798	46	0
Federal Oil and Gas (all minerals; oil and gas		1,588,599	86,555	388,932	82%	79%	84%	3,602	174	0
All Mineral Ownership		1,940,769	109,661	463,731				4,400	220	0
ADH Fee Oil and Gas		236,844	9,476	31,946	33%	53%	24%	537	19	0
ADH Federal Oil and Gas		478,685	8,564	102,837	67%	47%	76%	1,085	17	0
All ADH		715,529	18,040	134,783				1,622	36	0
PPH Fee Oil and Gas		87,990	1,061	12,300	39%	70%	17%	199	2	0
PPH Federal Oil and Gas		135,610	459	61,694	61%	30%	83%	307	1	0
All PPH		223,600	1,519	73,994				507	3	0
CRVFO										
Fee Oil and Gas (coal only and no minerals)		204863	111054	244744	39.03%	32.43%	19.39%	9000	0	0
Federal Oil and Gas		319996	231373	1017627.4	60.97%	67.57%	80.61%	5318	0	0
		524859	342427	1262371.4				14318	0	0
ADH Fee Oil and Gas		11,315	17,468	9,686	92%	26%	34%	309	0	0
ADH Federal Oil and Gas		996	48,671	18,747	8%	74%	66%	27	0	0
Total		12,311	66,139	28,432				336	0	0
PPH Fee Oil and Gas		10,053	11,499	6,807	97%	27%	49%	274	0	0

PPH Federal Oil and Gas		304	31,233	7,146	3%	73%	51%	8	0	0
		10,357	42,733	13,954				283	0	0
Roan Plateau Done										
Assume 5880 total wells per RFD										
Fee Oil and Gas (coal only and no minerals)		53,336	0	0	42%	**0%**	0%	2469	0	0
Federal Oil and Gas		73,681	0	0	58%	0%	0%	3411	0	0
		127,016	0	0	100%			5880	0	0
ADH Fee Oil and Gas		8,534	0	0	27%	0%	0%	395	0	0
ADH Federal Oil and Gas		31,633	0	0	79%	**0%**	0%	1464	0	0
		40,167						1859	0	0
PPH Fee Oil and Gas		27	0	0	100%	**0%**	0%	1		
PPH Federal Oil and Gas		0	0	0	0%	**0%**	0%	0		
		27						1		
LSFO										
Fee Oil and Gas (coal only and no minerals)		1,115,934	116,431	117,365	42%	27%	33%	1,220	25	10
Federal Oil and Gas		1,545,297	312,571	242,887	58%	73%	67%	1,690	66	20
		2,661,232	429,002	360,252				2,910	91	30
ADH Fee Oil and Gas		798,790	86,979	21,083	42%	39%	38%	873	18	2
ADH Federal Oil and Gas		1,083,571	137,452	34,180	58%	61%	62%	1,185	29	3
		1,882,361	224,431	55,262				2,058	48	5
PPH Fee Oil and Gas		491,654	51,926	7,532	42%	43%	43%	538	11	1
PPH Federal Oil and Gas		681,630	69,436	9,963	58%	57%	57%	745	15	1
		1,173,284	121,362	17,495				1,283	26	1
KFO (entire area regardless of ADH, PPH, etc)										
								RFD ratios used not GIS acres		
Fee Oil and Gas (coal only and no minerals)		101,795	44,335	417,546	46%	36%	33%	150	15	
Federal Oil and Gas		120,761	77,889	862,776	54%	64%	67%	179	26	
		222,556	122,225	1,280,321				329	41	
ADH Fee Oil and Gas		96,123	17,499	167,440	46%	56%	48%	142	6	
ADH Federal Oil and Gas		113,478	13,788	179,128	54%	44%	52%	168	5	
		209,601	31,287	346,568				310	10	
PPH Fee Oil and Gas		94,959	4,877	128,919	46%	37%	46%	114	2	

PPH Federal Oil and Gas		112,662	8,305	152,455	54%	63%	54%	193	3	
		207,621	13,182	281,374				307	4	
GJFO **conventional** (entire area regardless of ADH, PPH, etc)										
								RFD ratios used not GIS acres		
Fee Oil and Gas		352473	41762	150156	36%	25%	20%	3,363	118	79
Federal Oil and Gas		625129	124449	583544	64%	75%	80%	1,282	132	246
		977602	166211	733700				4,645	250	325
ADH Fee Oil and Gas		39,376	11,713	7,026	88%	69%	34%	1,969	585	351
ADH Federal Oil and Gas		5,264	5,220	13,659	12%	31%	66%	263	261	683
assume 20 acre spacing		44,640	16,933	20,685				2,232	846	1,034
2232 for high, 846 moderate, 1034 low										
PPH Fee Oil and Gas		30,585	9,012	2,886	98%	77%	29%	1,528	450	144
PPH Federal Oil and Gas		573	2,731	6,939	2%	23%	71%	29	137	347
assume 20 acre spacing		31,157	11,743	9,824				1,557	587	491
1557 high, 587 moderate, 491 low										
GJFO **shale** (entire area regardless of ADH, PPH, etc)										
								RFD ratios used not GIS acres		
Fee Oil and Gas (coal only and no minerals)		122,235	171,845	171,845	17%	39%	19%	1,050	456	
Federal Oil and Gas		592,203	267,971	751,914	83%	61%	81%	1,869	239	
		714,438	439,816	923,758				2,919	695	
ADH Fee Oil and Gas		4,927	50,434	0	28%	83%	0%	35	360	
ADH Federal Oil and Gas		12,661	10,596	0	72%	17%	0%	90	76	
assume 140 acre spacing resulting in:		17,588	61,030	0				125	436	
125 wells very high and high, 436 moderate, 0 low										
PPH Fee Oil and Gas		1,558	38,180	0	20%	92%		11	272	
PPH Federal Oil and Gas		6,292	3,300	0	80%	8%		45	24	
assume 140 acre spacing resulting in:		7,850	41,480	0				56	296	
56 wells very high and high, 296 moderate, 0 low										

GJFO Conventional	Conventional Wells- rational	Shale Gas here?	Rational Totals	RFD
Federal Minerals only				
Base Case – Wells Drilled	1660 (83/year)			
Base Case – Wells Completed	1577 (79/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled	5220 (261/year)			
Base Case – Wells Completed	4959 (248/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
20 year life for Mesa Verde well
Estimated Ultimate Recovery 1.47 billion cubic feet (BCF)
Initial Potential 2.96 MMscf/d and 3 Bbl/d condensate
Wells are considered to start production on Jan 1 of each year
261 conventional wells drilled per year (4645 total)
95% successful completion rate
248 conventional wells/year completed successfully
83 federal mineral conventional wells per year (1660 total)
20 acre down hole spacing for Mesa Verde Play.
No down hole access from off lease acerage
Shale gas evaluated separately, not included in Conventional
Wells drilled at a uniform rate during 20-year RFD projection

Federal	1,810.70	1,810.70								
Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	38.47	38.47								
2010	52.78	52.78								
2011	62.02	62.02								
2012	68.91	68.91								
2013	74.45	74.45								
2014	79.09	79.09								
2015	83.40	83.40								
2016	87.37	87.37								
2017	91.02	91.02								

2018	94.38	94.38								
2019	97.47	97.47								
2020	100.31	100.31								
2021	102.93	102.93								
2022	105.33	105.33								
2023	107.55	107.55								
2024	109.58	109.58								
2025	111.46	111.46								
2026	113.18	113.18								
2027	114.77	114.77								
2028	116.23	116.23								

BCF - billion cubic feet

MBO - thousand barrels of oil

All Minerals

5,684.23 5,684.23

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	120.75	120.75								
2010	165.69	165.69								
2011	194.69	194.69								
2012	216.34	216.34								
2013	233.72	233.72								
2014	248.28	248.28								
2015	261.82	261.82								
2016	274.28	274.28								
2017	285.74	285.74								
2018	296.28	296.28								
2019	305.98	305.98								
2020	314.91	314.91								
2021	323.12	323.12								
2022	330.67	330.67								
2023	337.62	337.62								
2024	344.01	344.01								
2025	349.89	349.89								
2026	355.31	355.31								
2027	360.28	360.28								
2028	364.86	364.86								

BCF - billion cubic feet
MBO - million barrels of oil

GJFO Shale			Shale Gas	RFD
Federal Minerals only				
Base Case – Wells Drilled			2108 (105/year)	
Base Case – Wells Completed			2003 (100/year)	
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled			3614 (181/year)	
Base Case – Wells Completed			3433 (172/year)	
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
50 year life for Shale Gas well
Estimated Ultimate Recovery 9.52 billion cubic feet (BCF)
Initial Potential 9 MMscf/d and 0 Bbl/d condensate
Wells are considered to start production on Jan 1 of each year
181 total wells drilled per year (3620 total)
95% successful completion rate
172 wells/year completed successfully
100 federal mineral wells per year (2000 total)
140 acre surface spacing - (500 horizontal, 6500 completed interval)
No down hole access from off lease acerage
CBM well production is considered negligible for all of GJFO
Wells drilled at a uniform rate during 20-year RFD projection

Federal	10,557.68	0.00								
	Base Case		**Alternative A**		**Alternative B**		**Alternative C**		**Alternative D**	
Year	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**
2009	172.54	0.00								
2010	254.55	0.00								
2011	313.77	0.00								
2012	361.48	0.00								
2013	402.04	0.00								
2014	437.64	0.00								
2015	470.39	0.00								
2016	500.52	0.00								
2017	528.25	0.00								
2018	553.75	0.00								
2019	577.22	0.00								

2020	598.80	0.00								
2021	618.66	0.00								
2022	636.93	0.00								
2023	653.74	0.00								
2024	669.21	0.00								
2025	683.44	0.00								
2026	696.53	0.00								
2027	708.57	0.00								
2028	719.65	0.00								

BCF - billion cubic feet

MBO - thousand barrels of oil

All Minerals

18,159.22 0.00

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	296.78	0.00								
2010	437.82	0.00								
2011	539.68	0.00								
2012	621.74	0.00								
2013	691.50	0.00								
2014	752.74	0.00								
2015	809.07	0.00								
2016	860.90	0.00								
2017	908.59	0.00								
2018	952.45	0.00								
2019	992.81	0.00								
2020	1,029.94	0.00								
2021	1,064.10	0.00								
2022	1,095.53	0.00								
2023	1,124.44	0.00								
2024	1,151.04	0.00								
2025	1,175.51	0.00								
2026	1,198.03	0.00								
2027	1,218.74	0.00								
2028	1,237.80	0.00								

BCF - billion cubic feet

MBO - thousand barrels of oil

WRFO	Conventional Wells		Totals	RFD Projections
Federal Minerals only				
Base Case – Wells Drilled	3780 (189/year)		3760	15743 (787/year)
Base Case – Wells Completed	3600 (180/year)		3600	
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled	4620 (231/year)			17800 (890/year)
Base Case – Wells Completed	4380 (219 / year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
20 year life for Mesa Verde well
Estimated Ultimate Recovery 1.47 billion cubic feet (BCF)
Initial Potential 2.96 MMscf/d and 3 Bbl/d condensate
Wells are considered to start production on Jan 1 of each year
231 wells drilled per year (4620 total)
95% successful completion rate
219 wells/year completed successfully
180 federal mineral conventional wells per year (3600 total)
20 acre down hole spacing for Mesa Verde Play.
No down hole access from off lease acerage
Wells drilled at a uniform rate during 20-year RFD projection
Wells/year based on recent WRFO permitting rates (~200/year)
Alternatives based on RFD would be ~4x typical WRFO rates

Federal

4,125.65 4,125.65

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	87.64	87.64								
2010	120.26	120.26								
2011	141.31	141.31								
2012	157.02	157.02								
2013	169.63	169.63								
2014	180.20	180.20								
2015	190.03	190.03								
2016	199.07	199.07								

2017	207.39	207.39								
2018	215.04	215.04								
2019	222.08	222.08								
2020	228.56	228.56								
2021	234.52	234.52								
2022	240.00	240.00								
2023	245.05	245.05								
2024	249.69	249.69								
2025	253.96	253.96								
2026	257.88	257.88								
2027	261.50	261.50								
2028	264.82	264.82								

BCF - billion cubic feet
MBO - thousand barrels of oil

All Minerals

5,019.54 5,019.54

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	106.63	106.63								
2010	146.32	146.32								
2011	171.92	171.92								
2012	191.04	191.04								
2013	206.39	206.39								
2014	219.24	219.24								
2015	231.20	231.20								
2016	242.20	242.20								
2017	252.32	252.32								
2018	261.63	261.63								
2019	270.20	270.20								
2020	278.08	278.08								
2021	285.33	285.33								
2022	292.00	292.00								
2023	298.14	298.14								
2024	303.79	303.79								
2025	308.98	308.98								
2026	313.76	313.76								
2027	318.15	318.15								

2028	322.20	322.20								

BCF - billion cubic feet
MBO - thousand barrels of oil

WRFO		O/G High Potential	O/G Medium Potential	O/G Low Potential	O/G High Potential	O/G Medium Potential	O/G Low Potential	Projected Wells - High Potential	Projected Wells - Medium Potential	Projected Wells - Low Potential	
		Acres	**Acres**	**Acres**	**%**	**%**	**%**	**Recent permitting rates used, not RFD projections**			
Fee Oil and Gas		352,169	23,105	74,799	18%	21%	16%	798	46	0	845
Federal Oil and Gas		1,588,599	86,555	388,932	82%	79%	84%	3,602	174	0	3,775
Total Oil and Gas		1,940,769	109,661	463,731	100%	100%	100%	4,400	220	0	4,620
											0
ADH Fee Oil and Gas		236,844	9,476	31,946	33%	53%	24%	537	19	0	556
ADH Federal Oil and Gas		478,685	8,564	102,837	67%	47%	76%	1,085	17	0	1,102
All ADH		715,529	18,040	134,783	100%	100%	100%	1,622	36	0	1,658
											0
PPH Fee Oil and Gas		87,990	1,061	12,300	39%	70%	17%	199	2	0	202
PPH Federal Oil and Gas		135,610	459	61,694	61%	30%	83%	307	1	0	308
All PPH		223,600	1,519	73,994	100%	100%	100%	507	3	0	510

LSFO	Conventional Wells- rational		Rational Totals	RFD
Federal Minerals only				
Base Case – Wells Drilled	1776 (89/year)			
Base Case – Wells Completed	142 (71/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled	3031 (152/year)			3031
Base Case – Wells Completed	2424 (121/year)			2424
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
All wells drilled in Sand Wash Basin
Decline rate of 5% a year
Wells are considered to start production on Jan 1 of each year.
Initial Potential 200 bbls/month and 10 MMscf/month (per RFD)
Drilled wells in 20-year RFD projection - 1255 Fee, 1776 Federal, 3031 Total
80% successful completion rate
Completed for production - 1004 Fee, 1420 Federal, 2424 Total
Completed for production per year - Fed 71/year, Total 121/year
High Potential areas will have 96% of potential wells drilled (per RFD)
Medium potential areas will have 3% of potential wells drilled (per RFD)
Low potential areas will have 1% of potential wells drilled
No down hole access from off lease acerage
Wells drilled at a uniform rate during 20 year RFD projection

Federal

26,620.68 1,331.03

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	170.40	8.52								
2010	332.28	16.61								
2011	486.07	24.30								
2012	632.16	31.61								
2013	770.95	38.55								
2014	902.81	45.14								
2015	1028.07	51.40								
2016	1147.06	57.35								
2017	1260.11	63.01								
2018	1367.50	68.38								
2019	1469.53	73.48								
2020	1566.45	78.32								
2021	1658.53	82.93								
2022	1746.00	87.30								
2023	1829.10	91.46								
2024	1908.05	95.40								
2025	1983.05	99.15								
2026	2054.29	102.71								
2027	2121.98	106.10								
2028	2186.28	109.31								

Cumulative Production Tot	
Production Year (of 20)	Sum Gas (BCF); one new well/year
1	2.400
2	4.680
3	6.846
4	8.904
5	10.859
6	12.716
7	14.480
8	16.156
9	17.748
10	19.261
11	20.698
12	22.063
13	23.360
14	24.592
15	25.762
16	26.874
17	27.930
18	28.934
19	29.887
20	30.793

BCF - billion cubic feet
MBO - thousand barrels of oil

All Minerals

45,367.64 2,268.38

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	290.40	14.52								
2010	566.28	28.31								
2011	828.37	41.42								
2012	1,077.35	53.87								
2013	1,313.88	65.69								
2014	1,538.59	76.93								
2015	1,752.06	87.60								
2016	1,954.85	97.74								
2017	2,147.51	107.38								
2018	2,330.54	116.53								
2019	2,504.41	125.22								
2020	2,669.59	133.48								
2021	2,826.51	141.33								
2022	2,975.58	148.78								
2023	3,117.20	155.86								
2024	3,251.74	162.59								
2025	3,379.56	168.98								
2026	3,500.98	175.05								
2027	3,616.33	180.82								
2028	3,725.91	186.30								

BCF - billion cubic feet
MBO - thousand barrels of oil

KFO	Conventional Wells		Totals	RFD
Federal Minerals only				
Base Case – Wells Drilled	177 (8.9/year)			
Base Case – Wells Completed	168 (8.4/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled	330 (16.5/year)			
Base Case – Wells Completed	313 (15.6/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
Linear decline rate of 5% a year
Distribution of future wells: 89 % in high potential, 11% in moderate
Wells are considered to start production on Jan 1 of each year.
Initial Potential 474 bbls/month, no Gas (per RFD)
Drilled wells in 20-year RFD projection: 153 Fee, 177 Federal, 330 Total
95% successful completion rate
Completed for production: 145 Fee, 168 Federal, 313 Total
Completed for production per year: 8.4 Fee, 9.1 Federal, 15.7 Total
Wells drilled at a uniform rate during 20 year RFD projection
No gas sales due to lack of pipeline infrastructure (per RFD)

Federal	0.00	622.02								
Year	**Base Case**		**Alternative A**		**Alternative B**		**Alternative C**		**Alternative D**	
	Gas (BCF)	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**
2009		3.98								
2010		7.76								
2011		11.36								
2012		14.77								
2013		18.01								
2014		21.10								
2015		24.02								
2016		26.80								
2017		29.44								
2018		31.95								

2019		34.34								
2020		36.60								
2021		38.75								
2022		40.80								
2023		42.74								
2024		44.58								
2025		46.34								
2026		48.00								
2027		49.58								
2028		51.09								

BCF - billion cubic feet
MBO - thousand barrels of oil

All Minerals

0.00 1,155.19

Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009		7.39								
2010		14.42								
2011		21.09								
2012		27.43								
2013		33.46								
2014		39.18								
2015		44.61								
2016		49.78								
2017		54.68								
2018		59.34								
2019		63.77								
2020		67.98								
2021		71.97								
2022		75.77								
2023		79.37								
2024		82.80								
2025		86.05								
2026		89.14								
2027		92.08								
2028		94.87								

BCF - billion cubic feet
MBO - thousand barrels of oil

CRVFO	Conventional Wells- rational		Rational Totals	RFD
Federal Minerals only				
Base Case – Wells Drilled	5318 (266/year)	0	3776	
Base Case – Wells Completed	5060 (253/year)	0	3587	
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled	14,318 (716/year)			
Base Case – Wells Completed	13,600 (680/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
20 year life for Mesa Verde well
Estimated Ultimate Recovery 1.47 billion cubic feet (BCF)
Initial Potential 2.96 MMscf/d and 3 Bbl/d condensate
Wells are considered to start production on Jan 1 of each year
716 wells drilled per year (14,318 total)
95% successful completion rate
Completed wells per year: 427 Fee, 253 Federal, 680 Total
20 acre down hole spacing for Mesa Verde Play.
No down hole access from off lease acerage
All new wells will be Mesa Verde Play
Wells drilled at a uniform rate during 20-year RFD projection

Federal

	5,798.83	5,798.83								
Year	**Base Case**		**Alternative A**		**Alternative B**		**Alternative C**		**Alternative D**	
	Gas (BCF)	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**
2009	123.19	123.19								
2010	169.04	169.04								
2011	198.61	198.61								
2012	220.70	220.70								
2013	238.43	238.43								
2014	253.28	253.28								
2015	267.10	267.10								

2016	279.81	279.81								
2017	291.50	291.50								
2018	302.25	302.25								
2019	312.15	312.15								
2020	321.25	321.25								
2021	329.63	329.63								
2022	337.34	337.34								
2023	344.43	344.43								
2024	350.95	350.95								
2025	356.95	356.95								
2026	362.47	362.47								
2027	367.55	367.55								
2028	372.22	372.22								

BCF - billion cubic feet
MBO - thousand barrels of oil

All Minerals

	15,585.79	15,585.79								
Year	**Base Case**		**Alternative A**		**Alternative B**		**Alternative C**		**Alternative D**	
	Gas (BCF)	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**
2009	331.10	331.10								
2010	454.32	454.32								
2011	533.82	533.82								
2012	593.19	593.19								
2013	640.83	640.83								
2014	680.76	680.76								
2015	717.89	717.89								
2016	752.05	752.05								
2017	783.47	783.47								
2018	812.38	812.38								
2019	838.98	838.98								
2020	863.45	863.45								
2021	885.96	885.96								
2022	906.67	906.67								
2023	925.73	925.73								
2024	943.26	943.26								
2025	959.39	959.39								

2026	974.23	974.23								
2027	987.88	987.88								
2028	1,000.43	1,000.43								

BCF - billion cubic feet

MBO - thousand barrels of oil

Roan Plateau	Conventional Wells			RFD
Federal Minerals only				
Base Case – Wells Drilled	3411 (171/year)			3441
Base Case – Wells Completed	3240 (163/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				
Federal, State, and Fee Surface				
Base Case – Wells Drilled	5880 (294/year)			
Base Case – Wells Completed	5585 (279/year)			
No Action Alt – Wells Drilled				
No Action Alt – Wells Completed				
Alternative B – Wells Drilled				
Alternative B – Wells Completed				
Alternative C – Wells Drilled				
Alternative C – Wells Completed				
Alternative D – Wells Drilled				
Alternative D – Wells Completed				

Assumptions:
20 year life for Mesa Verde well
Estimated Ultimate Recovery 1.47 billion cubic feet (BCF)
Initial Potential 2.96 MMscf/d and 3 Bbl/d condensate
Wells are considered to start production on Jan 1 of each yea
Wells drilled: 2469 Fee, 3411 Federal, 5880 Total (294/year)
95% successful completion rate
Completed for production: 2345 Fee, 3240 Federal, 5585 tot
Completed for production per year: 116 Fee, 163 Federal, 27
Number of wells per year restricted by resources per RFD
10 acre down hole spacing for Mesa Verde Play
No down hole access from off lease acerage for base case
All new wells will be Mesa Verde Play
Wells drilled at a uniform rate during 20-year RFD projection

Federal	3,736.00	3,736.00								
Year	Base Case		Alternative A		Alternative B		Alternative C		Alternative D	
	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)	Gas (BCF)	Oil (MBO)
2009	79.37	79.37								
2010	108.90	108.90								
2011	127.96	127.96								
2012	142.19	142.19								
2013	153.61	153.61								
2014	163.18	163.18								
2015	172.08	172.08								

2016	180.27	180.27								
2017	187.80	187.80								
2018	194.73	194.73								
2019	201.11	201.11								
2020	206.97	206.97								
2021	212.37	212.37								
2022	217.34	217.34								
2023	221.90	221.90								
2024	226.10	226.10								
2025	229.97	229.97								
2026	233.53	233.53								
2027	236.80	236.80								
2028	239.81	239.81								

BCF - billion cubic feet

MBO - thousand barrels of oil

All Minerals

	6,394.76	6,394.76								
Year	**Base Case**		**Alternative A**		**Alternative B**		**Alternative C**		**Alternative D**	
	Gas (BCF)	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**	**Gas (BCF)**	**Oil (MBO)**
2009	135.85	135.85								
2010	186.41	186.41								
2011	219.02	219.02								
2012	243.38	243.38								
2013	262.93	262.93								
2014	279.31	279.31								
2015	294.55	294.55								
2016	308.56	308.56								
2017	321.45	321.45								
2018	333.32	333.32								
2019	344.23	344.23								
2020	354.27	354.27								
2021	363.51	363.51								
2022	372.00	372.00								
2023	379.82	379.82								

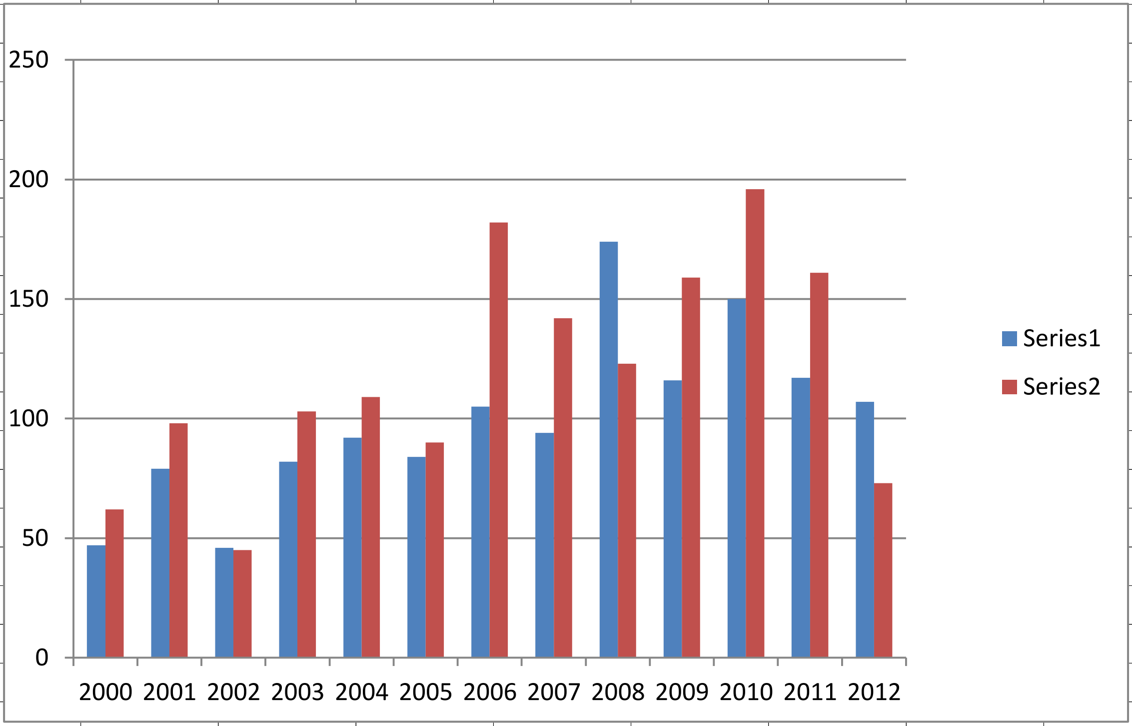
2024	387.01	387.01								
2025	393.63	393.63								
2026	399.72	399.72								
2027	405.32	405.32								
2028	410.47	410.47								

BCF - billion cubic feet
MBO - thousand barrels of oil

Meeker

	Spuds AY	AAPDs AY
1999		
2000	47	62
2001	79	98
2002	46	45
2003	82	103
2004	92	109
2005	84	90
2006	105	182
2007	94	142
2008	174	123
2009	116	159
2010	150	196
2011	117	161
2012	107	73
Average	99	119

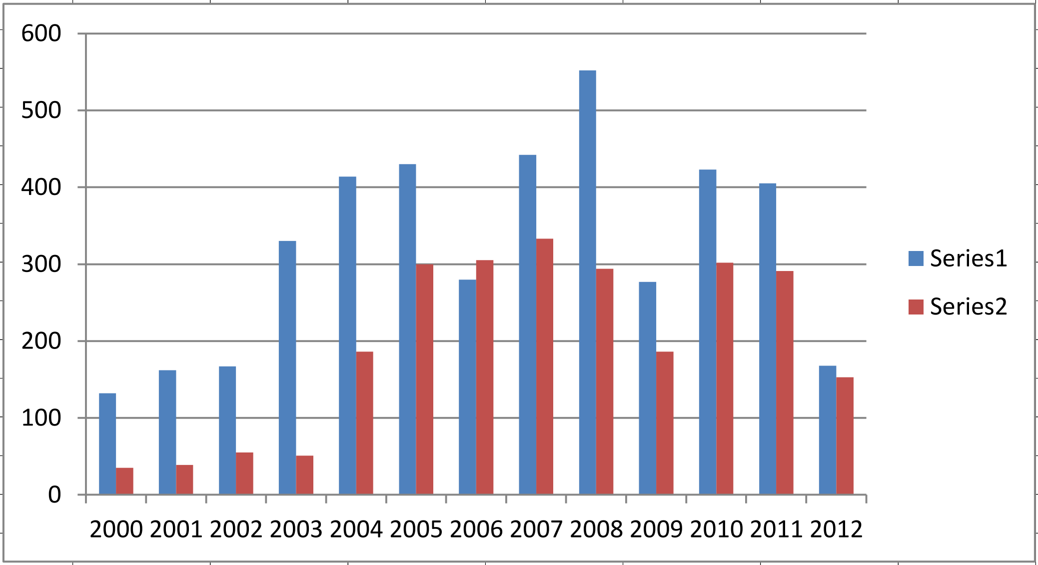
WRFO RFD 15,743 wells for 20? Years
i.e. 790 wells per year



GJFO

	Spuds by AY	AAPD's by AY
2000	2	3
2001	6	5
2002	3	4
2003	10	11
2004	13	18
2005	17	16
2006	40	42
2007	18	21

2008	20	19
2009	4	4
2010	0	4
2011	10	16
2012	0	45
	11	16
CRVFO	Spuds by AY	AAPD's by AY
2000	132	35
2001	162	39
2002	167	55
2003	330	51
2004	414	186
2005	430	300
2006	280	305
2007	442	333
2008	552	294
2009	277	186
2010	423	302
2011	405	291
2012	168	153
Average	322	195



Msv well type per well for 20 year Product

Year	Gas Prod MMSCF	Oil Prod Bbl	WRFO completio Year
1	486.91	486.91	
2	181.22	181.22	1
3	116.91	116.91	2
4	87.31	87.31	3
5	70.07	70.07	4
6	58.72	58.72	5
7	54.60	54.60	6
8	50.23	50.23	7
9	46.21	46.21	8
10	42.52	42.52	9
11	39.12	39.12	10
12	35.99	35.99	11
13	33.11	33.11	12
14	30.46	30.46	13
15	28.02	28.02	14
16	25.78	25.78	15
17	23.72	23.72	16
18	21.82	21.82	17
19	20.07	20.07	18
20	18.47	18.47	19
	1471.23	1,471.23	20

Shale Gas type well	Gas Production MMSCF	
1	1725.449	1
2	820.012	2
3	592.195	3
4	477.124	4
5	405.581	5
6	356.017	6
7	327.54	7
8	301.33	8
9	277.23	9
10	255.05	10
11	234.64	11
12	215.87	12
13	198.6	13
14	182.71	14
15	168.1	15
16	154.65	16
17	142.28	17
18	130.9	18
19	120.42	19
20	110.79	20

7196.488

tion

486.91												
181.22	486.91											
116.91	181.22	486.91										
87.31	116.91	181.22	486.91									
70.07	87.31	116.91	181.22	486.91								
58.72	70.07	87.31	116.91	181.22	486.91							
54.60	58.72	70.07	87.31	116.91	181.22	486.91						
50.23	54.60	58.72	70.07	87.31	116.91	181.22	486.91					
46.21	50.23	54.60	58.72	70.07	87.31	116.91	181.22	486.91				
42.52	46.21	50.23	54.60	58.72	70.07	87.31	116.91	181.22	486.91			
39.12	42.52	46.21	50.23	54.60	58.72	70.07	87.31	116.91	181.22	486.91		
35.99	39.12	42.52	46.21	50.23	54.60	58.72	70.07	87.31	116.91	181.22	486.91	
33.11	35.99	39.12	42.52	46.21	50.23	54.60	58.72	70.07	87.31	116.91	181.22	486.91
30.46	33.11	35.99	39.12	42.52	46.21	50.23	54.60	58.72	70.07	87.31	116.91	181.22
28.02	30.46	33.11	35.99	39.12	42.52	46.21	50.23	54.60	58.72	70.07	87.31	116.91
25.78	28.02	30.46	33.11	35.99	39.12	42.52	46.21	50.23	54.60	58.72	70.07	87.31
23.72	25.78	28.02	30.46	33.11	35.99	39.12	42.52	46.21	50.23	54.60	58.72	70.07
21.82	23.72	25.78	28.02	30.46	33.11	35.99	39.12	42.52	46.21	50.23	54.60	58.72
20.07	21.82	23.72	25.78	28.02	30.46	33.11	35.99	39.12	42.52	46.21	50.23	54.60
18.47	20.07	21.82	23.72	25.78	28.02	30.46	33.11	35.99	39.12	42.52	46.21	50.23

1725											
820	1725										
592.2	820	1725									
477.1	592.2	820	1725								
405.6	477.1	592.2	820	1725							
356	405.6	477.1	592.2	820	1725						
327.5	356	405.6	477.1	592.2	820	1725					
301.3	327.5	356	405.6	477.1	592.2	820	1725				
277.2	301.3	327.5	356	405.6	477.1	592.2	820	1725			
255.1	277.2	301.3	327.5	356	405.6	477.1	592.2	820	1725		
234.6	255.1	277.2	301.3	327.5	356	405.6	477.1	592.2	820	1725	
215.9	234.6	255.1	277.2	301.3	327.5	356	405.6	477.1	592.2	820	1725
198.6	215.9	234.6	255.1	277.2	301.3	327.5	356	405.6	477.1	592.2	820
182.7	198.6	215.9	234.6	255.1	277.2	301.3	327.5	356	405.6	477.1	592.2
168.1	182.7	198.6	215.9	234.6	255.1	277.2	301.3	327.5	356	405.6	477.1
154.7	168.1	182.7	198.6	215.9	234.6	255.1	277.2	301.3	327.5	356	405.6
142.3	154.7	168.1	182.7	198.6	215.9	234.6	255.1	277.2	301.3	327.5	356
130.9	142.3	154.7	168.1	182.7	198.6	215.9	234.6	255.1	277.2	301.3	327.5
120.4	130.9	142.3	154.7	168.1	182.7	198.6	215.9	234.6	255.1	277.2	301.3
110.8	120.4	130.9	142.3	154.7	168.1	182.7	198.6	215.9	234.6	255.1	277.2

							486.91
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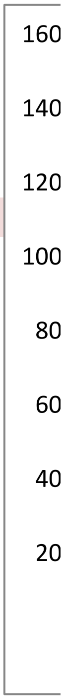
181.22	486.91						1361.37
116.91	181.22	486.91					1387.15
87.31	116.91	181.22	486.91				1410.86
70.07	87.31	116.91	181.22	486.91			1432.68
58.72	70.07	87.31	116.91	181.22	486.91		1452.76
54.60	58.72	70.07	87.31	116.91	181.22	486.91	1471.23
							22920.27



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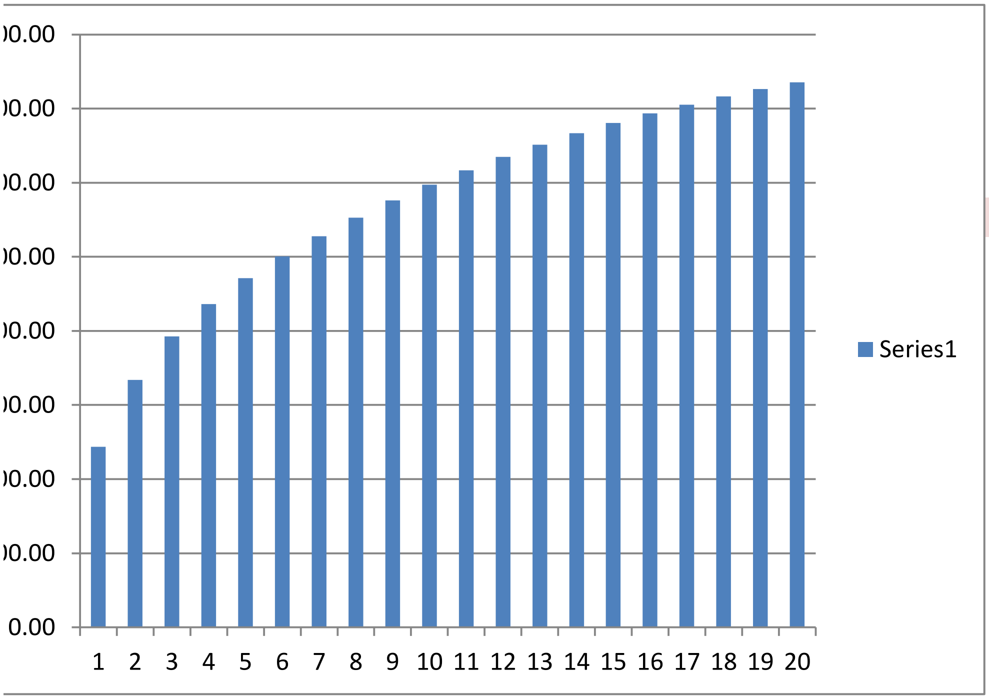
								5988.038
1725								6186.638
820	1725							6369.348
592.2	820	1725						6537.448
477.1	592.2	820	1725					6692.098
405.6	477.1	592.2	820	1725				6834.378
356	405.6	477.1	592.2	820	1725			6965.278
327.5	356	405.6	477.1	592.2	820	1725.449		7085.698
301.3	327.5	356	405.6	477.1	592.2	820.012	1725.449	7196.488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Series1

From: Wolfgang, Gregory [gwolfgan@blm.gov]
Sent: Wednesday, March 13, 2013 7:25 AM
To: Uriarte, Alex
Subject: Re: FW: Socioeconomic CRVFO data

Categories: (none)

Alex,

I did get a chance to look over the impacts table.For our field office, I don't feel that we need to have a reduction for any of the alternatives.

On Wed, Mar 13, 2013 at 8:15 AM, Uriarte, Alex<Alex.Uriarte@icfi.com>wrote:

> Hi, Greg,
>
> Were you able to take a look at the table I sent you? And were you able to think about the impacts table? Please let me know. We are on the hookto deliver our impacts section this Friday.
>
> Thanks,
>
> Alex
>
> **ALEX URIARTE**|TechnicalSpecialist|703.218.2587|alex.uriarte@icfi.com|icfi.com
>
> **ICF INTERNATIONAL**| 9300 Lee Highway, Fairfax, VA 22031|703.934.3000
>
> Connect with us onsocial media.
>
> ---
>
> **From:**Uriarte, Alex
> **Sent:**Sunday, March 10, 2013 1:54 PM
>
> **To:**Gregory Wolfgang (gwolfgan@blm.gov); Kimberly Miller (kmmiller@blm.gov)
> **Subject:**Socioeconomic CRVFO data
>
> Greg,
>
> See attached: I modified Table 1 that Kim had provided to approximate the recreational category distributions among day/night and local/nonlocal to reflectto some extent the kinds of differences among recreational categories found in national statistics. I also kept the total distributions of recreation close to that of the White River NF. The resulting table is in the tab called “step 4” and I explain on thetop of each tab what I did. Please let me know if you agree that I move forward and use this data.
>
> Per our conversation last week, I look forward to receiving from you Table 2 of the data request at earliest convenience.

Thanks,

Alex

ALEX URIARTE|TechnicalSpecialist|703.218.2587|alex.uriarte@icfi.com|icfi.com

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From: Uriarte, Alex
Sent: Friday, March 08, 2013 4:32 PM
To: Gregory Wolfgang (gwolfgan@blm.gov)
Cc: Kimberly Miller (kmmiller@blm.gov)

Subject:FW: Socioeconomic CRVFO data

Hi, Greg,

Thanks for getting back to me. As discussed on the phone, see attached what we received from other field offices, just as a reference. Feel free to providewhatever you think is appropriate for your FO.

Best regards,

Alex

ALEX URIARTE|TechnicalSpecialist|703.218.2587|alex.uriarte@icfi.com|icfi.com

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From:ICF_SGSE
Sent: Thursday, March 07, 2013 1:30 PM
To: Gregory Wolfgang (gwolfgan@blm.gov); Kimberly Miller (kmmiller@blm.gov)
Subject:FW: Socioeconomic CRVFO data

Hi, Kimberly and Gregory,

I just left a voice mail for each of you. I am working on the socioeconomic impact sections for the Sage Grouse EIS for NW Colorado and would like to talk abit about the recreation data you provided to us (see emails below). We are on the hook to provide our impact analysis by March 15 so I would appreciate it if we could discuss at your earliest convenience, since your data feeds into our analysis. Please feelfree to call my cell phone (703-439-9812), call me at my office (number below), or let me know when you would be available to discuss and I will call you.

I look forward to hearing from you,

Alex

ALEX URIARTE|TechnicalSpecialist|703.218.2587|alex.uriarte@icfi.com|icfi.com

ICF INTERNATIONAL| 9300 Lee Highway, Fairfax, VA 22031|703.934.3000

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From: Jones, Erin [mailto:erjones@blm.gov]

Sent: Tuesday, February 05, 2013 5:18 PM
To: Fetter, Rob; Uriarte, Alex
Cc: Gregory Wolfgang; Kimberly Miller
Subject: Fwd: Socioeconomic CRVFO data

Hi Rob and Alex -

See attached data request for recreation for the CRVFO (thank you Kim and David!).

Please take a look at the data provided and the explanation of the data and let us know if you have any questions at all.

Thanks so much!

Erin

Erin Jones

NW Colorado District

NEPA Coordinator

2815 H Road

Grand Junction, CO81506

(970) 244-3008

---------- Forwarded message ----------
From:**Miller, Kimberly**<kmmiller@blm.gov>
Date: Tue, Feb 5, 2013 at 3:12 PM
Subject: Fwd: Socioeconomic CRVFO data
To: Erin Jones<erjones@blm.gov>
Cc: Gregory Wolfgang<gwolfgan@blm.gov>

Erin,

Attached are our socioeconomic numbers.We don't have much information to make these assumptions, so we used the White River National Forest Visitor Use information (which David Epstein has provided to me) for all of our activities.So,our assumptions are that our percentages should be close to White River NF because of our proximity to the forest location, and that all activities share similar percentages.We had to make those assumptions because we don't have any more specific data.

Please let me know if you have any further questions.

---------- Forwarded message ----------
From:**Epstein, David**<depstein@blm.gov>
Date: Tue, Feb 5, 2013 at 1:31 PM
Subject: Re: Socioeconomic CRVFO data
To:"Miller, Kimberly"<kmmiller@blm.gov>

Kim,

Here is what I found for all activity types for White River NF:

Non-Local Day 11.0%

Non-Local Overnight 53%

Local Day 23.0%

Local Overnight 4.0%

Non-Primary 9.0%

Total: 100.0%

Let me know what you find out from Erin.

-David

On Tue, Feb 5, 2013 at 12:26 PM, Miller, Kimberly<kmmiller@blm.gov>wrote:

David,

Did you ever get Erin the socioeconomic information she needs to the Sage Grouse EIS?

On Thu, Dec 20, 2012 at 10:42 AM, Epstein, David<depstein@blm.gov>wrote:

> Kimberly,
>
> Yes, I think I have all that data, but I might have to get it from the contractor from the RMP. From Erin's message, they need it after Jan 9, not before, right? Either way, I'll try to get it to you as soon as I can, but it might be afterthe holidays.
>
> -David
>
> On Wed, Dec 19, 2012 at 10:11 AM, Miller, Kimberly<kmmiller@blm.gov>wrote:
>
> David,
>
> I have been asked by Erin Jones for socioeconomic data for the Sage Grouse EIS.I was wondering if you had something similar to this table in our RMP that you are using, or if you had any assumptions in our RMP that I can use?I wouldlike this to match our RMP if possible...
>
> Thanks!
>
> ---------- Forwarded message ----------
> From:**Jones, Erin**<erjones@blm.gov>
> Date: Wed, Dec 19, 2012 at 9:56 AM
> Subject: Socioeconomic Data Request - Recreation - CRVFO - NW CO Sage Grouse EIS
> To: Kimberly Miller<kmmiller@blm.gov>
> Cc:"Fetter, Rob"<Rob.Fetter@icfi.com>,"Uriarte, Alex"<Alex.Uriarte@icfi.com>,"Sidon, Joshua B"<jsidon@blm.gov>
>
> Hi Kim -
>
> As you know, we're working away on getting the data that is required for the socioeconomic impact analysis for the NW CO Sage Grouse EIS.
>
> Please find attached the data request for Recreation for the Colorado River Valley Field Office.
>
> We need for you to fill out this data request as soon as possible after the January 9th deadline for Ch. 4 sections.
>
> If you have any questions at all, please don't hesitate to let me know and I can get answers from

> Hope you have a GREAT holiday Kim!
>
> Thanks so much!
>
> *Erin*
>
> Erin Jones

> NW Colorado District
>
> NEPA Coordinator
>
> 2815 H Road
>
> Grand Junction, CO81506
>
> (970) 244-3008
>
> --
> Kimberly Miller
>
> Outdoor Recreation Planner
>
> Bureau of Land Management
>
> Colorado River Valley Field Office
>
> 2300 River Frontage Road
>
> Silt, CO81652
>
> (970) 876-9075
>
> kmmiller@blm.gov
>
> Recreation Permit Information:http://www.blm.gov/co/st/en/fo/crvfo/recreation/SRP.html
>
> Fax:(970) 876-9090 Make sure to put Attn:Kimberly Miller

--
Kimberly Miller

Outdoor Recreation Planner

Bureau of Land Management

Colorado River Valley Field Office

2300 River Frontage Road

Silt, CO81652

(970) 876-9075

kmmiller@blm.gov

Recreation Permit Information:http://www.blm.gov/co/st/en/fo/crvfo/recreation/SRP.html

Fax:(970) 876-9090 Make sure to put Attn:Kimberly Miller

--

David Epstein

Economist, Colorado State Office

Bureau of Land Management

2850 Youngfield Street

Lakewood CO 80215

Office: 303.239.3948

Fax: 303.239.3808

--
Kimberly Miller

Outdoor Recreation Planner

Bureau of Land Management

Colorado River Valley Field Office

2300 River Frontage Road

> Silt, CO81652
>
> (970) 876-9075
>
> kmmiller@blm.gov
>
> Recreation Permit Information:http://www.blm.gov/co/st/en/fo/crvfo/recreation/SRP.html
>
> Fax:(970) 876-9090 Make sure to put Attn:Kimberly Miller

--
Greg Wolfgang
Acting Supervisory Natural Resource Specialist
Bureau of Land Management
Colorado River Valley Field Office

From: Trimble, Lorenzo [ltrimble@blm.gov]
Sent: Tuesday, March 24, 2015 9:51 AM
To: Uriarte, Alex
Subject: Re: FW: Socio-economic questions
Attachments: RFD-Geothermal_Caluculations_for_Socio-economics.xlsx

Categories: (none)

Alex,

I got some revised numbers yesterday that included SFA, and revised that on the table. It increased the percent affected a little bit for the proposed plan.

Attached is my Excel file that includes all the calculations.

Lorenzo Trimble
Geologist - Geothermal Program Lead
BLM Nevada State Office
775-861-6567

On Tue, Mar 24, 2015 at 7:35 AM, Uriarte, Alex<Alex.Uriarte@icfi.com>wrote:

> Yes. I understand there is a concentration of Basque descendants around Idaho, Nevada, Utah, and Northern California….
>
> **ALEX URIARTE**|TechnicalSpecialist|703.218.2587|alex.uriarte@icfi.com|icfi.com
>
> **ICF INTERNATIONAL**| 9300 Lee Highway, Fairfax, VA 22031|703.934.3000
>
> Connect with us onsocial media.
>
> **From:**Trimble, Lorenzo [mailto:ltrimble@blm.gov]
> **Sent:**Monday, March 23, 2015 10:32 PM
> **To:**Uriarte, Alex
> **Subject:**Re: FW: Socio-economic questions
>
> I see that have you have a Basque last name. My mother's maiden name is Uruburu. Right on!
>
> Lorenzo Trimble

Geologist - Geothermal Program Lead

BLM Nevada State Office

775-861-6567

On Mon, Mar 23, 2015 at 3:33 PM, Uriarte, Alex<Alex.Uriarte@icfi.com>wrote:

Lorenzo,

Thank you for your input on the impact of the proposed plan on geothermal development in
your assumptions change in the near future, please do let us know.

Thanks,

Alex

ALEX URIARTE|TechnicalSpecialist|703.218.2587|alex.uriarte@icfi.com|icfi.com

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From: Randall Sharp [mailto:sharphay@att.net]
Sent: Saturday, March 21, 2015 6:57 PM
To: Julie Suhr Pierce; Uriarte, Alex
Cc: Lauren Mermejo
Subject: Fw: Socio-economic questions

Our last one.

Sharp Consultants Inc
sharphay@att.net
775-746-8791
530-640-4398 (cell)

On Saturday, March 21, 2015 3:20 PM,"Trimble, Lorenzo"<ltrimble@blm.gov>wrote:

Randy,

Attached is my response regarding geothermal.

Lorenzo Trimble

Geologist - Geothermal Program Lead

> BLM Nevada State Office
>
> 775-861-6567
>
> On Thu, Mar 12, 2015 at 4:08 PM, Davis, David<drdavis@blm.gov>wrote:
>
> Randy,
>
> I attached Table R-8 for oil and gas and it has new numbers based on a new table (Table L-4) I created for the oil and gas RFD. Now we can tie these numbers back to something to help justify the logic.Geothermal is being worked on as we speak and should be completed tomorrow afternoon.
>
> Dave Davis
>
> Nevada State Office Geologist
>
> Phone: 775-861-6575
>
> On Thu, Mar 12, 2015 at 1:04 PM, Randall Sharp<sharphay@att.net>wrote:
>
> Lorenzo/Dave
>
> Have you guys responded to the attached questionnaire?If not, can you see if you completed it this week.
>
> Thanks,
>
> Randy
>
> **Randall M. Sharp**
>
> sharphay@att.net
>
> *Sharp Consultants Inc*
>
> *775-746-8791*
>
> *530-640-4398 (cell)*

Alternatives compared to Alternative A with 41,322,100 acres of moderate & high geothermal potential i
area

Alternative	Moderate and High Geothermal Potential in:			Percent reduction in geothermal leasing, exploration, and development (%)	Description of Alte
	SFA	PHMA	GHMA		
B	N/A	5,261,300	N/A	12.7	PHMA closed to geoth leasing. Existing leases NSO with exceptions.
C	N/A	8,707,300	N/A	21.1	All GRSG habitat consi PHMA and closed to ge leasing.
D	N/A	5,524,000	3,183,200	13.4 - 21.1	PHMA: NSO without W GHMA: NSO with exce
E	N/A	5,261,300	3,446,000	0 - 21.1	PHMA & GHMA open geothermal leasing, ex and development, but avoidance, minimizatio mitigation of impacts t habitat.
F	N/A	5,261,300	3,446,000	21.1	PHMA & GHMA closed geothermal leasing. O leases could be explor Impacts and RFD proj would be similar or the those described under Alternative C.
Proposed Plan	1,076,300	5,413,000	3,324,600	13.7 - 23.7	PHMA considered SFA: WEMs. PHMA: NSO wi conditions. GHMA: ope and CSU stipulations & avoidance, minimizati mitigation of impacts t habitat.

planning

rnative		41,322,000		
ermal in PHMA				
dered eothermal		8,707,200		
EMs & ptions.	13.36818	21.071584	21.1	
to loration, require n, and GRSG	12.73244	8.3393834	13.4 7.7 8,707,300 21.071826	
to new ly existing d. ctions same as				
NSO no th 3 n with TL n, and o GRSG	2.604666	13.09956	8.0455931	8,737,600 23.74982

From: Uriarte, Alex [Alex.Uriarte@icfi.com]
Sent: Wednesday, February 18, 2015 6:37 AM
To: Julie Suhr Pierce
CC: Stewart Allen; Johnson, Laura; Sidon, Joshua B (jsidon@blm.gov); Fetter, Rob; ICF_SGSE
Subject: RE: Great Basin GRSG - NEPA PM Call Tuesday

Thanks, Julie,

I was on the Great Basin call yesterday and I agreed to provide Lauren Mermejo (who led the call) with data requests for the various resource areas by the end of the week. I would also participate on the call next week where I understand we would establish deadlines for the various resource areas to get us their input on the effects of the proposed plan for their resource areas.

I think the main message needs to be that that resource specialists need to keep in mind that a) the economic analysis depends on their input; b) the socioeconomic section must be consistent with what they write in their sections. This means that they need provide us input in a timely fashion and they need to communicate to us any last minute modifications to their sections. Furthermore, it seems like the Great Basin will give us only about three and a half weeks to analyze the proposed plan, so that BLM regional offices can do their internal reviews before forwarding the documents. We previously had the opportunity to look at draft sections of other resource areas, so that we could bring into the socioeconomic sections any relevant information. It seems like we will not have the opportunity to do so this time around, so we will need to work closely to remain consistent in what we are saying.

I have not seen the proposed plans yet, so I cannot formulate specific questions with regards to anything that is in there (Lauren said she would provide the proposed plans). NV/CA had previously provided a draft proposed plan that we analyzed as “Alternative G,” but I suspect the actual proposed plan is quite different.

We will be asking input from the resources specialists on grazing (Mike Tietmeyer), oil and gas (John Menghini), geothermal (David Davis), wind energy (Wendy Seley), recreation (Dan Ryan, Leo Drumm), locatable and salable minerals (Scott Murrellwright), lands and realty and travel management (Dan Ryan, Leo Drumm). The names in brackets are those of people who I believe previously provided information. We will be asking for quantitative information from grazing (AUMs open and closed), oil and gas (numbers of wells drilled and completed), geothermal (MW installed), wind (MW installed) and for all resources areas we will request qualitative description of costs or restrictions to operators/investors/users.

I hope this helps. If you need to talk to me, I will be in my office all day.

Thanks,

Alex

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ICF INTERNATIONAL | 9300 Lee Highway, Fairfax, VA 22031 | 703.934.3000
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From: Julie Suhr Pierce [mailto:jsuhrpierce@blm.gov]
Sent: Tuesday, February 17, 2015 6:49 PM
To: Uriarte, Alex; Joshua Sidon
Cc: Stewart Allen; Johnson, Laura
Subject: RE: Great Basin GRSG - NEPA PM Call Tuesday

Alex, I'm in the NV/CA SG IDT meeting today and will also be here tomorrow. Is there anything specific that you'd like me to convey to the resource specialists for them to keep in mind or to which to explicitly pay special attention as they make the revisions necessary due to the changes in boundaries, the addition of Sagebrush Focal Areas, and any other expected changes in management and the new proposed action?

Thanks,
Julie

Julie A. Suhr Pierce, Ph.D.
Great Basin Socioeconomic Specialist
Bureau of Land Management - Utah
440 West 200 South, Suite 500
Salt Lake City, UT 84101-1345
jsuhrpierce@blm.gov
801-539-4290 (office)
801-597-2335 (cell)

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Tuesday, February 17, 2015 8:51 AM
To: Sidon, Joshua
Cc: Julie Suhr Pierce; Stewart Allen; Johnson, Laura
Subject: RE: Great Basin GRSG - NEPA PM Call Tuesday

Thanks, Josh. That is totally up to you. I feel comfortable explaining the type of input we will be looking for, that we will be sending data requests to each resource specialist and that we will need to stay coordinated until the sections are done to avoid inconsistencies. I am working under the assumption that there will be no changes of schedule at this point.

When we actually need to interact with the specialists, any help you all can provide in actually obtaining their input would be appreciated. We can initiate all the contacts and request the input (keeping you copied in emails), but your help in ensuring we do get the input we need in a timely fashion would be very much appreciated. I counted 37 resource areas that we discuss in the economic sections (among the 5 EISs) and for which we looked at resource specialists for their input (not always for input to IMPLAN, sometimes borrowing from their draft sections). So we will need to keep close track of this process.

Thanks, again,

Alex

ALEX URIARTE | Technical Specialist | 703.218.2587 | alex.uriarte@icfi.com | icfi.com
ICF INTERNATIONAL | 9300 Lee Highway, Fairfax, VA 22031 | 703.934.3000
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From: Sidon, Joshua [mailto:jsidon@blm.gov]
Sent: Tuesday, February 17, 2015 10:33 AM
To: Uriarte, Alex
Cc: Julie Suhr Pierce; Stewart Allen
Subject: Fwd: Great Basin GRSG - NEPA PM Call Tuesday

Hey Alex -

Would you like me, Julie, and/or Stewart to try to make this call as well?

Josh

---------- Forwarded message ----------
From: **David Batts** <david.batts@empsi.com>
Date: Fri, Feb 13, 2015 at 4:28 PM
Subject: Great Basin GRSG - NEPA PM Call Tuesday
To: Holly Prohaska <holly.prohaska@empsi.com>, Meredith Zaccherio <meredith.zaccherio@empsi.com>, Chad Ricklefs <chad.ricklefs@empsi.com>, "lmermejo@blm.gov" <lmermejo@blm.gov>, "mmagalet@blm.gov" <mmagalet@blm.gov>, Quincy Bahr <qfbahr@blm.gov>, "jsuther@blm.gov" <jsuther@blm.gov>, "bralston@blm.gov" <bralston@blm.gov>, "sharphay@att.net" <sharphay@att.net>, "'Tague, Joe" <jtague@blm.gov>, Derek Holmgren <derek.holmgren@empsi.com>, Angie Adams <angie.adams@empsi.com>, "jmunson@blm.gov" <jmunson@blm.gov>, "Sarah.Shattuck@sol.doi.gov" <Sarah.Shattuck@sol.doi.gov>, "ssmall@blm.gov" <ssmall@blm.gov>, Carol-Anne Garrison <ca.garrison@empsi.com>, Drew Vankat <drew.vankat@empsi.com>, "scarman@blm.gov" <scarman@blm.gov>, "jarubado@blm.gov" <'jarubado@blm.gov'>, "Quamen, Frank R" <fquamen@blm.gov>, "ssmith@blm.gov" <ssmith@blm.gov>, "mdillon@fs.fed.us" <mdillon@fs.fed.us>, "'rmickelsen@fs.fed.us' (rmickelsen@fs.fed.us)" <rmickelsen@fs.fed.us>, "'Herren, Vicki (vherren@blm.gov)' (vherren@blm.gov)" <vherren@blm.gov>, "Beck, Jonathan M (jmbeck@blm.gov)" <jmbeck@blm.gov>, "'Stein, Glen' (gstein@fs.fed.us)" <gstein@fs.fed.us>, "mhildner@blm.gov" <mhildner@blm.gov>, "akosic@blm.gov" <akosic@blm.gov>, "nhaug@blm.gov" <nhaug@blm.gov>, "ssieber@blm.gov" <ssieber@blm.gov>
Cc: "Uriarte, Alex" <Alex.Uriarte@icfi.com>, Joshua Sidon <jsidon@blm.gov>, David Batts <david.batts@empsi.com>

Reminder - Great Basin GRSG PM conference call Tuesday (2/17) at 10AM Pacific Time / 11AM Mountain Time. Call in info and draft agenda below.

877-928-4213
participants: 9009662#

Agenda

1. WO review updates

    - Any additional questions for WO on guidance

2. Coordination and incorporation of socioeconomic analysis

3. Schedule – immediate critical paths:

    - Submit data to NOC (due 2/13) – Complete (verify)

    - Comment response team – Carol-Anne pulling together the team and approach

    - Update Chapter 2 (due 2/20)

    - Direct and Indirect impact analysis (3/27)

4. Other topics?

5. Action Items from past calls

<u>WO, Sub regional PMs, and Forest Service</u>

- National comment response team to reconvene and review national responses in light of the new guidance.

<u>EMPSi</u>

- Review comment response reports to determine which responses may change based on new guidance.

David Batts
EMPSi Environmental Management and Planning Solutions, Inc.
3775 Iris Avenue, Suite 1A
Boulder, CO 80301
tel: 303-447-7160 cell: 303-652-7047 fax: 866-625-0707
www.EMPSi.com Twitter: EMPSInc Facebook: EMPSi

Bringing clarity to the complex ™

Asheville Denver Portland Reno San Francisco Santa Fe Washington, DC

--
Josh Sidon
Branch Chief Planning and Assessment (Acting)
BLM Colorado State Office
303-239-3936

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Friday, January 9, 2015 3:36 PM
To: Uriarte, Alex
CC: Julie Suhr Pierce; ICF_SGSE
Subject: Re: GRSG NVCA - wind estimates

Just to follow up, I'm not entirely sure if I'm prior assessment it right. However, based on the multipliers in the methods appendix it just seems that way. For example, total jobs = 1.646/MW for construction and = 0.205 per MW for operations. Maybe it has something to do with total construction period verses operational period. Anyway, any clarity would be appreciated. Thanks.

Josh

On Fri, Jan 9, 2015 at 4:15 PM, Sidon, Joshua <jsidon@blm.gov> wrote:

> Hi Alex,
>
> I happened to be looking the economic impacts associated with wind energy operations for of our subregions, and I believe there is an error in the operation job estimates for NVCA. The estimated operation jobs seem way too high in comparison to the construction estimates...maybe a magnitude too high. Can you please review and get back to us?
>
> Thanks.
>
> Josh
>
> --
> ***Josh Sidon, Ph.D.***
> Economist, National Operations Center
> Bureau of Land Management
> Denver Federal Center, Bldg. 50
> P.O. 25047
> Denver, CO 80225
> Phone: 303-236-6343
> Fax: 303-236-3508

--
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From: Miller, Chris J -FS [chrismiller@fs.fed.us]
Sent: Thursday, July 3, 2014 11:10 AM
To: Uriarte, Alex
CC: Sidon, Joshua B (jsidon@blm.gov)
Subject: RE: Q re: estimated production

Categories: (none)

Thanks Alex.

You answered all my questions except for the 6th bullet. I also request a few clarifications be added to app W and/or your worksheets based on yourresponses. I added some of soapbox language to your response to the last bullet (i.e. input output analysis is over-rated!!).See**greentextbelow.

Chris

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Thursday, July 03, 2014 11:06 AM
To: Miller, Chris J -FS
Cc: Sidon, Joshua B (jsidon@blm.gov)
Subject:RE: Q re: estimated production

Hi, Chris,

Sorry for not answering earlier. Please see my answers below in red. Thanks for doing this.

Alex

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From: Miller, Chris J -FS [mailto:chrismiller@fs.fed.us]
Sent: Tuesday, July 01, 2014 9:45 PM
To: Uriarte, Alex
Cc: Sidon, Joshua B (jsidon@blm.gov)
Subject:Q re: estimated production

Alex,

Thanks for providing the worksheets and revised RFD – lots of help. And geez – the OG impact calculations are indeed complicated – lots of details and tweeksneed to be tracked!

I have three questions about specific calculations for OG (more pressing):

- In table W-5, I get about half of the estimated production numbers. To calculate an average number of new producing wells per year over a 15 yearperiod, I assumed that there would be no production in year one (when only drilling and completion would be occurring), and then each subsequent year would be the accumulation of wells completed in prior years until you reach year 15. If you assume an averagenumber of producing wells to be the number of completed wells in year 7.5 and multiply that by 15yr production per well – then that should give you total production over a 15 year period? Same question applies to the spreadsheets.Yes. My numbers account for impacts beyond the 15 year period. I will adjust.

- For the “input” worksheet – should the total completed wells for existing (line 18) and new leases (line 26) add up to equal the total number of completedwells in line 11?Yes, I had made an assumption regarding share of completion of wells on new leases being the same as that on old leases to get the completion numbers for newleases but what you suggest is clearly the right way to do this. Thanks.

- Should the multiplier adjustments apply equally to drilling and completion for wells on pph inexisting leasesas it would to wells on pph innew leases,across all action alternatives (i.e., do the same drilling and design feature cost impacts apply to new wells in both lease areas, consistently across all alternatives)? Right now, itseems we apply the same 1.38 adjustment across Alternatives B, C, and D when in fact the requirements/conditions might differ for those alternatives.When we estimated the number of wells on existing leases under each alternative based on the increase in drilling and completion costs for wells in PPH (cost spreadsheet we developedfor Tyler), the assumption was that the conditions required are the same for any wells in PPH, whether in existing or new leases and across alternatives. I think we need to stick to this, even though it may not be exact (the RDF, for example, says that “ alternativesB, C,and to a lesser extent, D,include management decisions (i.e. management actions MA-MIN-21 through MA-MIN-31 in Table 2.1 of the EIS) that would be applied to new development on existing leases.”).**Canwe specify this simplifying assumption in App W?

It would also be good to get clarification about the following (less pressing):

- Appendix W could really use a table that shows cost per well and percentage of total wells, by type of well (e.g., vert, hor, directional), by alternative.Ok, I will include

- For Appendix W on pg W-8, I think we need a more complete explanation of how costs per well compare between Alternative A/E and the Alts BCD – andthen explain how those differences in costs were used to adjust Tex’s original multipliers. It might help if we walked through the multiplier adjustments in the spreadsheets.Ok

- For wells on existing leases, I thought we were assuming that drilling/completion expenditures for new wells remain constant across the alternatives,implying that job impacts for new wells on existing leases would also be equal across alternatives? Unless the distribution of expenses changes across the industry sectors for different alternatives – and this might be the case if increased allocations ofexpenses for design features are assigned to a different industry sector (you might be diverting $ from drill rigs to fence builders?). Production and production jobs would indeed drop under the action alternatives because fewer wells are developed (basedon Alex’s prior calculations/worksheets). The calculation sheets do not break out impacts according to existing vs new leases – so its hard to tell if calculations are consistent with the assumption that expenditure and labor impacts remain constant for existingleases.Drilling/completion expenditures for new wells in existing leases remains the same across alternatives for those wells in PPH. The share of wells in PPH is differentin each alternative. Also, the assumption for existing leases is that the number of wells drops in inverse proportion to the increase in costs so that the expenditures remain the same (the idea of a fixe budget by operators).**Not sure if you are confirming or denying that expenditures (and job impacts) for drilling and completion of new wells on existing leases is the same across alternatives?I thought drilling/completion expenditures forallnew wells in existing lease areas, that overlap the analysis area, remains the same across alternatives, regardless of whether wells are in pph or not (because there is no pph in Alternative A).

- Its not clear why adjustments are applied to multipliers for Alternative A (as implied in the “all drill compl Impact” worksheet). It was my impressionthat, after talking with Tex (and Mike Retzlaff) that Tex’s multipliers already account for the current drilling conditions (i.e., Tex’s mulitpliers accounted for directional/horizontal drilling (55%/2%), plus fracking)? An adjustment of 1.03 is pretty minoreither way though….You might be right,but we started the cost estimates of wells in PPH for Tyler under the assumption that $3,250,000 is the average cost of a vertical well.This number actually came from the mid-point of a range (between $1,500,000 and $5,000,000) that includes more expensive horizontal and directional drilling but also cheaper CBNG wells. I think we need to stick to this assumption**and “this assumption” is the assumption that average actual drill/completion costs for Alt A is something slightly greater than $3,250,000? Again – please clarify withtext or table footnotes in app W.)at his point.

- Can you clarify the source for numbers of wells within and outside Fed PPH in worksheet “All drill compl Impact” – I couldn’t find those numbers inthe RFD tables. Maybe they are the result of your interpretations of the information in the text for the RFD – as reflected in the many comment bubbles in the “input” worksheet?Yes, but I believe the numbers in that tab are actually explicitly in the RFD. You need to look at table R1 of the RFD and in the last sentences of each section of the RFD textwhere some breakdown of the wells is described.**add this clarification to footnote to “all drill compl impact” worksheet.

- With the substantial increase in multipliers for Fed pph wells – is there a chance that we might be calculating increased numbers of jobs for developmentwithinnew leasesunder an action alternative (i.e., number of wells drilled goes down, but number of jobs per well goes up to offset reduced number of wells in new lease areas)?Not sure I totally understand your question but the number of jobs per well definitely goes up with the increase in costs. This is the issue we discussed on the phone where ameasure assumed to be restrictive would actually increase the local economic impact due to the increase in local expenditures. Again, not sure if this was what you were asking.**Itis indeed my question. Fortunately for us, the total reduction in number of wells on new leases under Alt D and the proposed alternative (in your “Input” spreadsheet) is just large enough to offset the 1.38 factor increase in costs per well, such that we appearto be calculating a decrease in OG jobs for new leases under Alt D (and proposed alt), relative to A. But the decrease is pretty small – and if there had been just a few more fed wells in pph under Alt D – we might have had the unfortunate result that jobsactually increase under Alt D for new leases. These types of results further reinforce my distrust of the use of input output analysis (what we should be looking at is net benefits and net benefits per well – rather than changes in OG employment)!

Thanks again,
Chris

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Saturday, June 28, 2014 10:10 PM
To: Sidon, Joshua
Cc:ICF_SGSE; Kurz, Elizabeth; Fetter, Rob; Miller, Chris J -FS
Subject:RE: UT GRSG - O&G econ analysis files

Josh, Chris,

See attached the Excel workbooks with the IMPLAN calculations for oil and gas for the GRSG FEIS. If you don't see the formula in some cells, try looking atAlternative C. Since I revised Alternative C last, it should show all the formulas.

Alex

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From: Sidon, Joshua [mailto:jsidon@blm.gov]
Sent: Friday, June 27, 2014 11:41 AM
To: Uriarte, Alex
Cc:ICF_SGSE; Kurz, Elizabeth; Fetter, Rob; Miller, Chris J -FS
Subject:UT GRSG - O&G econ analysis files

Hi Alex,

As we discussed earlier this week, please send Chris and me the files used to calculate the econ impacts associated with O&G as soon as possible. Given the magnitude of the potential impact, it is important for us to understand and followthe calculations; especially since it is not possible to replicate the results based on the information in the document (both Chap 4 and the method appendix).

Thanks.

Josh

--
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From: Julie Suhr Pierce [jsuhrpierce@blm.gov]
Sent: Tuesday, April 7, 2015 7:51 PM
To: Uriarte, Alex
CC: Quincy Bahr; Chris J -FS Miller
Subject: Re: SFAs comment

Categories: (none)

My assessment is that there is no a priori identifiable economic impact due to the nature of the permit renewal process.

What are your thoughts, Quincy?

Julie

Sent from my iPhone

On Apr 7, 2015, at 8:47 PM, Uriarte, Alex<Alex.Uriarte@icfi.com>wrote:

> Hi, all,
> If SFAs add acres under restrictions, the language suggested by Chris would seem appropriate to me, but please note that we did not ignore the SFAs when looking at potential economic impacts of the Proposed Plan,although we were under the impression that SFAs were a subset of PHMAs. We included mention when we were able to identify an economic impact. For example, for grazing under the Proposed Plan our understanding is that the main effect of the SFAs is that theassessment of rangeland health standards and desired conditions will start in allotments in SFAs, then go on to PHMA and then to GHMA, while under current management it is done as grazing permits expire. Other than the order, it is not clear to me whetherthis will have an increased economic impact but we do describe the possibilities of impacts from assessment of rangeland health standards and desired conditions. On the other hand, the Proposed Plan in Utah does recommend withdrawal of mineral developmentin SFA and we mention this.
> Alex
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>
> ---
>
> **From:**Julie Suhr Pierce [mailto:jsuhrpierce@blm.gov]
> **Sent:**Tuesday, April 07, 2015 8:27 PM
> **To:**Quincy Bahr
> **Cc:**Uriarte, Alex; Chris J -FS Miller
> **Subject:**Re: SFAs comment
> Quincy,
> I think you're going to have to respond to thus one.Utah's chapters went to EMPSi for final edits this morning.Dos this merit recalling them?

Julie

Sent from my iPhone

On Apr 7, 2015, at 6:02 PM, Miller, Chris J -FS<chrismiller@fs.fed.us>wrote:

> Sorry for this late comment, but the email from Madelyn Dillon below indicates that sagebrush focal areas will in fact add some lands subject to more restrictions/limitations/exclusions. For example, In Utah,there is an additional 35,000 acres of non-habitat that is now subject to "strongest levels of protection" that is not (I assume) included in the other alternatives. Not really an issue in WY or C), but could be an issue as well in NV where 90,000 acres ofgeneral habitat are in SFAs.
> Is it possible to add some sentences to the beginning of the econ sections (e.g., section 4.22.2 for UT) stating that "the inclusion of sagebrush focal areas (SFAs), representing recognized "strongholds" forGRSG that have the strongest levels of protection, under the proposed plan, may increase restrictions (e.g., exclusions) on activities in some general habitat and non-habitat areas, thereby increasing the potential for economic impacts in some areas underthe proposed plan. The relative economic impact of SFAs may be relatively small."
> For Forest Service – maybe this is only worth noting for UT and NV. However, I don't know what the numbers show for BLM lands.
> Chris
>
> ---
>
> **From:**Dillon, Madelyn -FS
> **Sent:**Monday, April 06, 2015 10:24 AM
> **To:**Miller, Chris J -FS
> **Subject:**RE: SFAs comment
> Chris –
>
> In the plans, we define SFAs as:*Areas identified by the U.S. Fish and Wildlife Service that represent recognized "strongholds" for greater sage-grouse and are considered most vital to the species persistence and therefore, have the strongest levels of protection.*
> While the FS has minimal to no acres in SFAs (NV has the most acres). SFAs do include non-habitat and in NV, other habitat. Perhaps due to the small amount of acres, there wouldn't be any measurable socioecono impact.
> I just completed a briefing paper for the Iverson for the Chief. Here's the data:

State	Priority habitat	General Habitat	Non habitat	Other mapped habitat (applies to NV only)	Total NFS acres in SFAs
Utah	11,841	0	35,591		47,432
Idaho	236,265	0	11,632		247,897
Nevada	394,222	90,180	4,353	80,177	488,755

Wyoming	2,239	0	559		2,798
Colorado	0	0	0		0

<image002.png>

Madelyn Dillon
Deputy National Greater Sage-grouse Project Manager
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Fort Collins, CO 80526
www.fs.fed.us
<image004.png><image006.png><image008.png>
Caring for the land and serving people

Click on image to visit our greater sage-grouse intranet site.
<image009.png>

From: Miller, Chris J -FS
Sent: Saturday, April 04, 2015 10:59 AM
To: Dillon, Madelyn -FS
Subject:SFAs comment

Madelyn,

In one of your comments for lands you as how we are incorporating sagebrush focal areas into our lands econ discussion, as well as other subsections in the econ section. Currently, we are not really bringing that up at all. It was my impressionthat SFAs were sub-areas within PHMAs that would receive special attention and might tend toward more protective end of the spectrum for RDFs and conservation measure guidelines, as well as prioritization for treatments/restoration. The existence of SFAs wouldnot necessarily be increasing areas of exclusion or avoidance for ROWs etc. (though I guess there is some possibility for small areas of non-habitat or GHMA to be included within SFAs that could jack up requirements and costs on land users that would not haveoccurred in absence of the SFA)?

Can you let me know of some specific examples we might want to be noting in the econ sections to capture inceases in economc impacts associated with SFAs under the proposed plan (Im assuming SFAs don’t exist under other alts)? Happy toadd language to the econ sections.

Thanks,
Chris

From: Miller, Chris J -FS [chrismiller@fs.fed.us]
Sent: Thursday, March 12, 2015 9:58 AM
To: Uriarte, Alex
Subject: RE: UT lands

Sure – sounds good. I talked to Madelyn further, and its not clear that we will be getting much from FS staff, as there is no formal request to FS to provide input to effects section to the FEIS. More to come on that I guess.

From: Uriarte, Alex [mailto:Alex.Uriarte@icfi.com]
Sent: Wednesday, March 11, 2015 12:22 PM
To: Miller, Chris J -FS
Cc: Johnson, Laura; Bishop, Aaron
Subject: RE: UT lands

Thanks, for forwarding, Chris. I appreciate your suggestions to Madelyn as well, I think they will help. When we receive her final input, I might need to follow-up with a call to her to make sure we are interpreting correctly, if that is ok with you.

Thanks,

Alex

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From: Miller, Chris J -FS [mailto:chrismiller@fs.fed.us]
Sent: Monday, March 09, 2015 1:51 PM
To: Dillon, Madelyn -FS; Harber, Dale -FS; Bambrough, Dustin J -FS
Cc: Uriarte, Alex; Johnson, Laura
Subject: RE: UT lands

Thanks Madelyn!

When you say “impacts to the public” – could you say whether its adverse or positive impacts (I think I can interpret whats positive or negative – but I was a little uncertain about some of the undesignated/designated language) to consumers of the utilities?

If there will be any quantitative language about miles of corridor effects in your own effects section – could you make a note of that (so ICF can look for those at later date in case needed)?

ICF might alter some of the language to make it consistent with final draft EIS language – I’m ccing Alex and Laura at ICF in case they with to weigh in.

Chris

From: Dillon, Madelyn -FS
Sent: Wednesday, March 04, 2015 1:29 PM
To: Miller, Chris J -FS
Subject: UT lands

Hi Chris – Before a start on the either ID or NV, would you please take a look at the attached, and let me know if the response is sufficient?

Thanks.

Madelyn Dillon
National Greater Sage-grouse Deputy Project Manager
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Caring for the land and serving people

Click on image to visit our greater sage-grouse intranet site.

From: Kate Krebs [kate.krebs@empsi.com]
Sent: Tuesday, February 24, 2015 9:40 AM
To: Chad Ricklefs; Annie Daly; Amy Cordle; Jordan Adams; Meredith Zaccherio; Liza Wozniak; Holly Prohaska; Zoe Ghali; Carol-Anne Garrison; Derek Holmgren; Peter Gower; Drew Vankat; Matt Kluvo; Katie Patterson; Bahr, Quincy; Morgan Trieger; rchi@blm.gov; ssieber@blm.gov; rnaeve@blm.gov; Uriarte, Alex
Subject: RE: UTSG Proposed Plan Analysis Kickoff
Attachments: Disturbance Presentation_02-10-15.pptx; Issues Resolved_UT 1 30 15 final.docx; OKAY_AltF_PPMA Development February 2015 with Sage Focal Areas.pdf

Team:
Attached are some materials that contain information for review on the call Thursday. We will not go over all of it, but certain concepts as they relate to Utah.

Kate Krebs
EMPSi Environmental Management and Planning Solutions, Inc.
3775 Iris Avenue, Suite 1A
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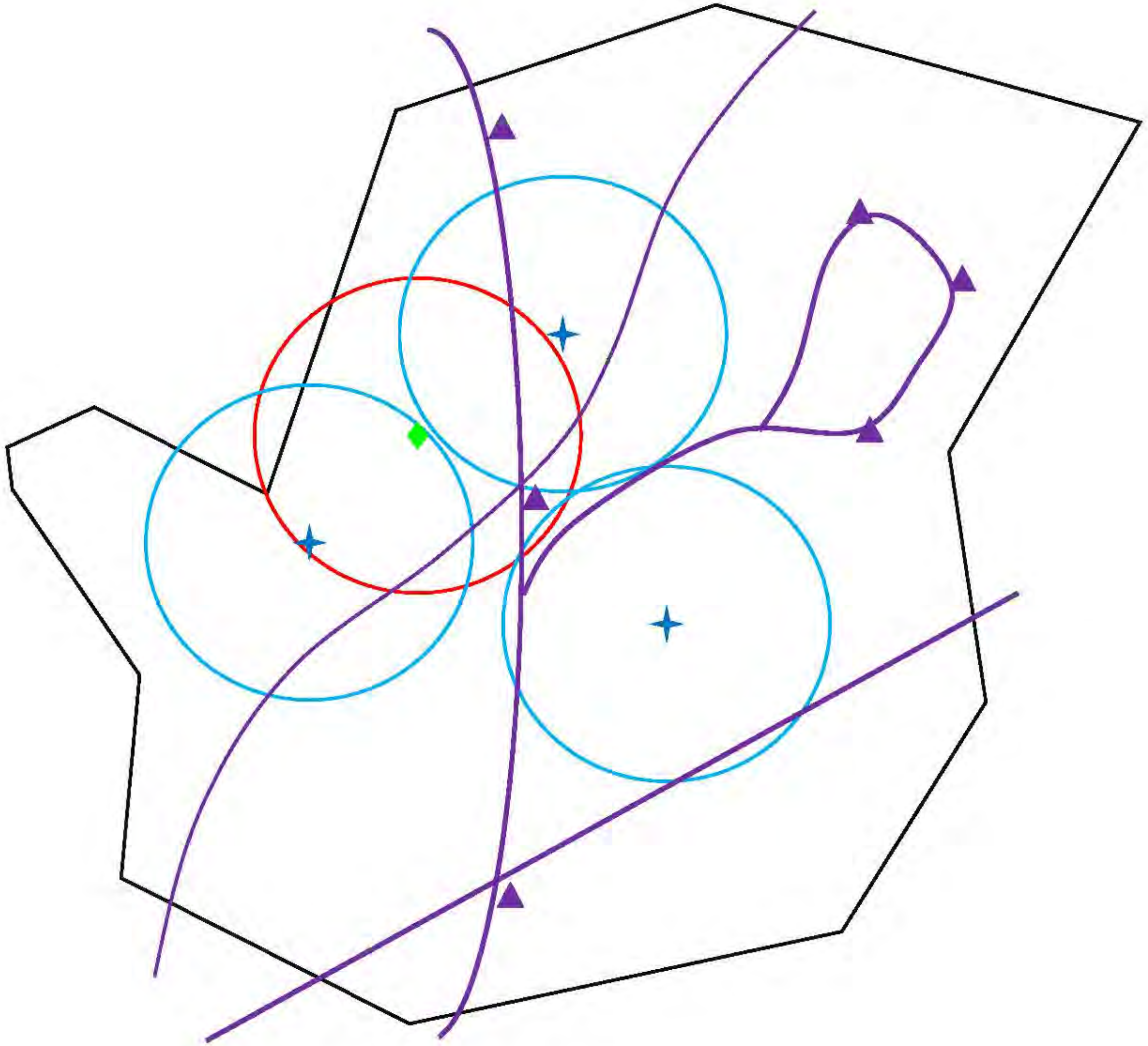
-----Original Appointment-----
From: Kate Krebs
Sent: Wednesday, February 11, 2015 5:35 PM
To: Kate Krebs; Chad Ricklefs; Annie Daly; Amy Cordle; Jordan Adams; Meredith Zaccherio; Liza Wozniak; Holly Prohaska; Zoe Ghali; Carol-Anne Garrison; Derek Holmgren; Peter Gower; Drew Vankat; Matt Kluvo; Katie Patterson; Bahr, Quincy
Cc: Morgan Trieger; rchi@blm.gov; ssieber@blm.gov; rnaeve@blm.gov; Uriarte, Alex
Subject: UTSG Proposed Plan Analysis Kickoff
When: Thursday, February 26, 2015 1:00 PM-2:30 PM (UTC-07:00) Mountain Time (US & Canada).
Where:

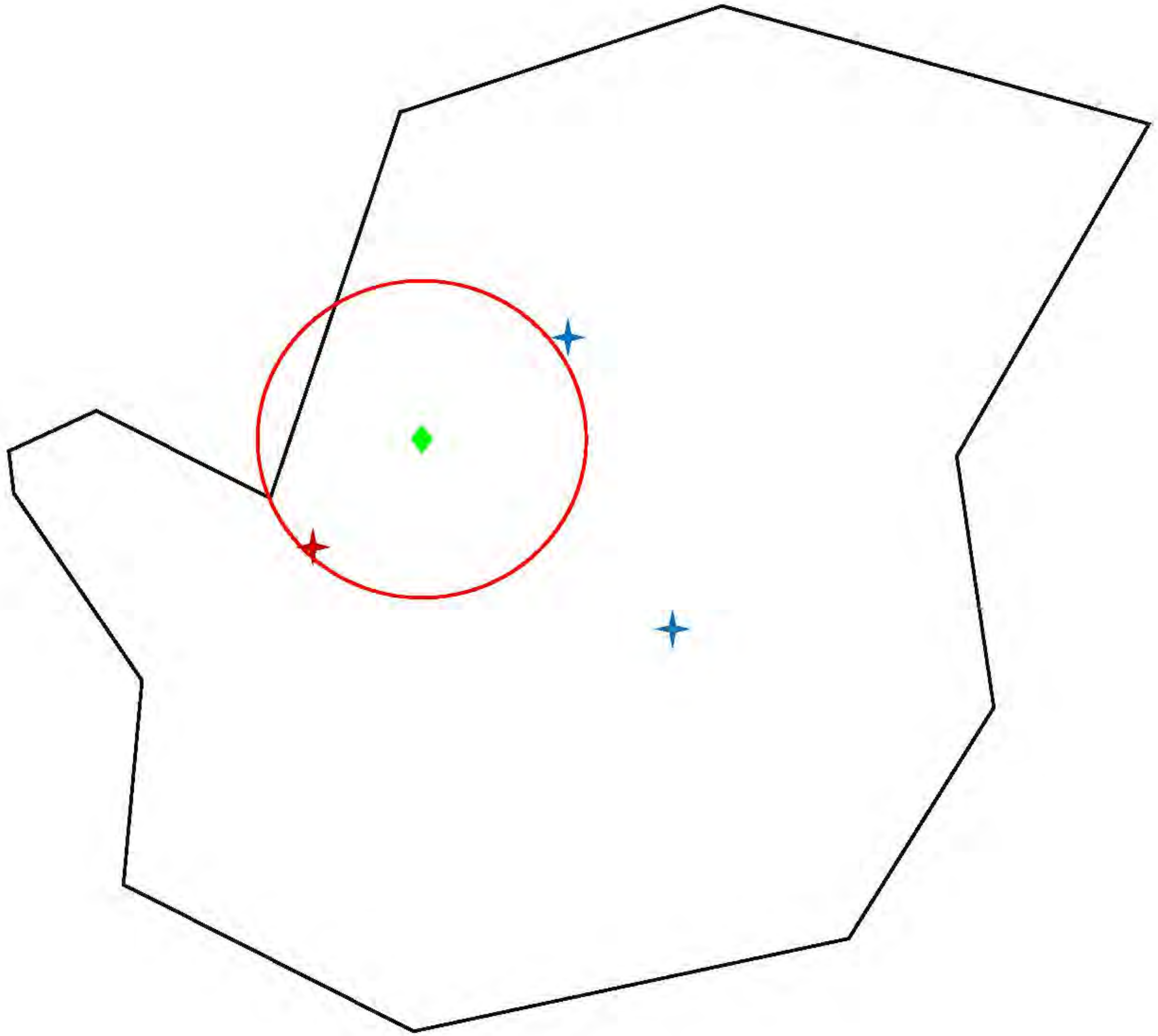
You are invited to the kickoff meeting for the UTSG Proposed Plan impacts analysis. Quincy will review the major changes between draft and final, particularly as they relate to the Utah Subregion. We will send out some materials for your review in advance of the meeting. As a heads-up, we WILL be asking for GIS requests before the meeting in order to stick with the schedule. Let Chad or me know if you have any questions between now and then. Thank you.

[redacted]

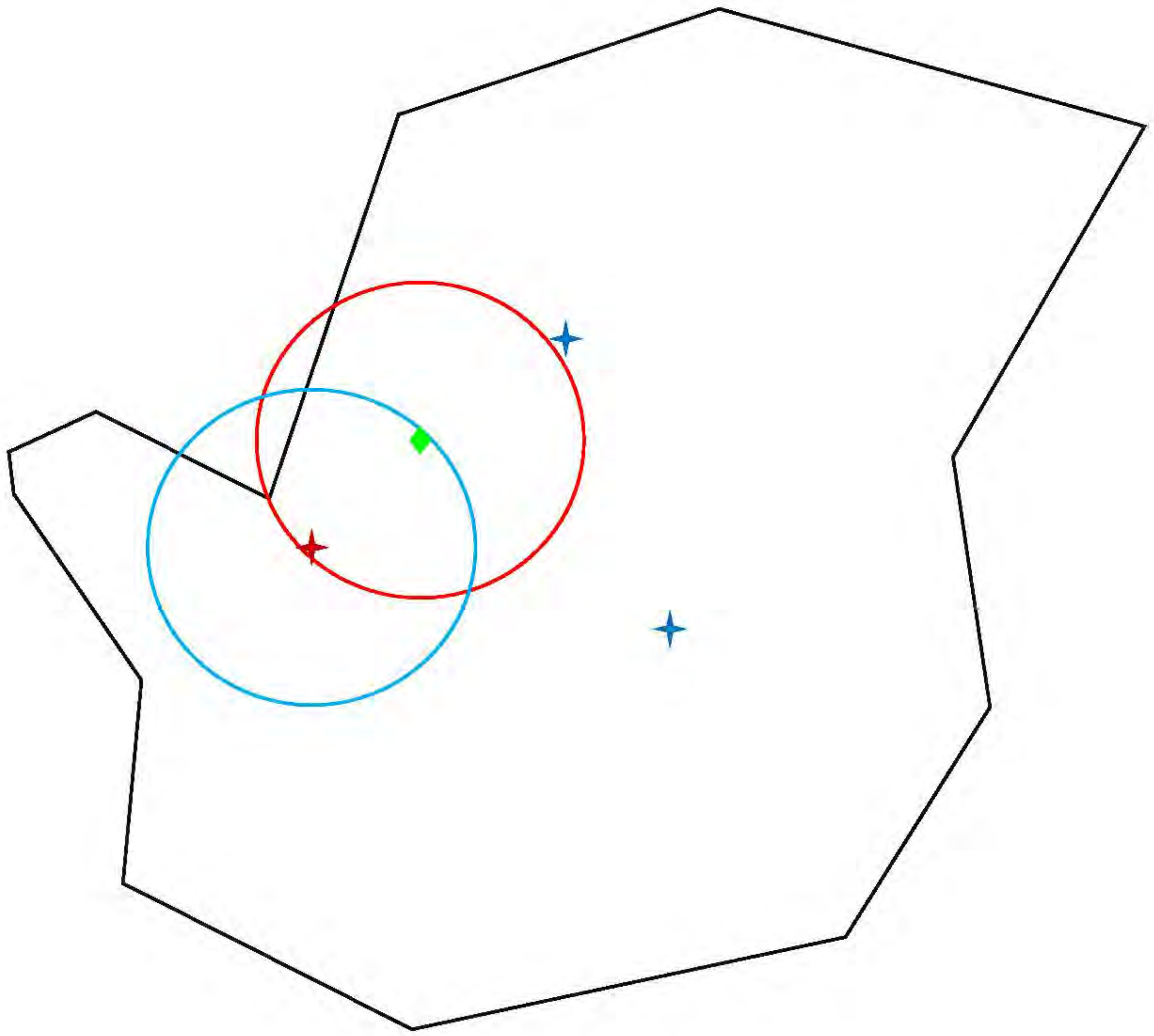


Disturbance Calculation Scenario:

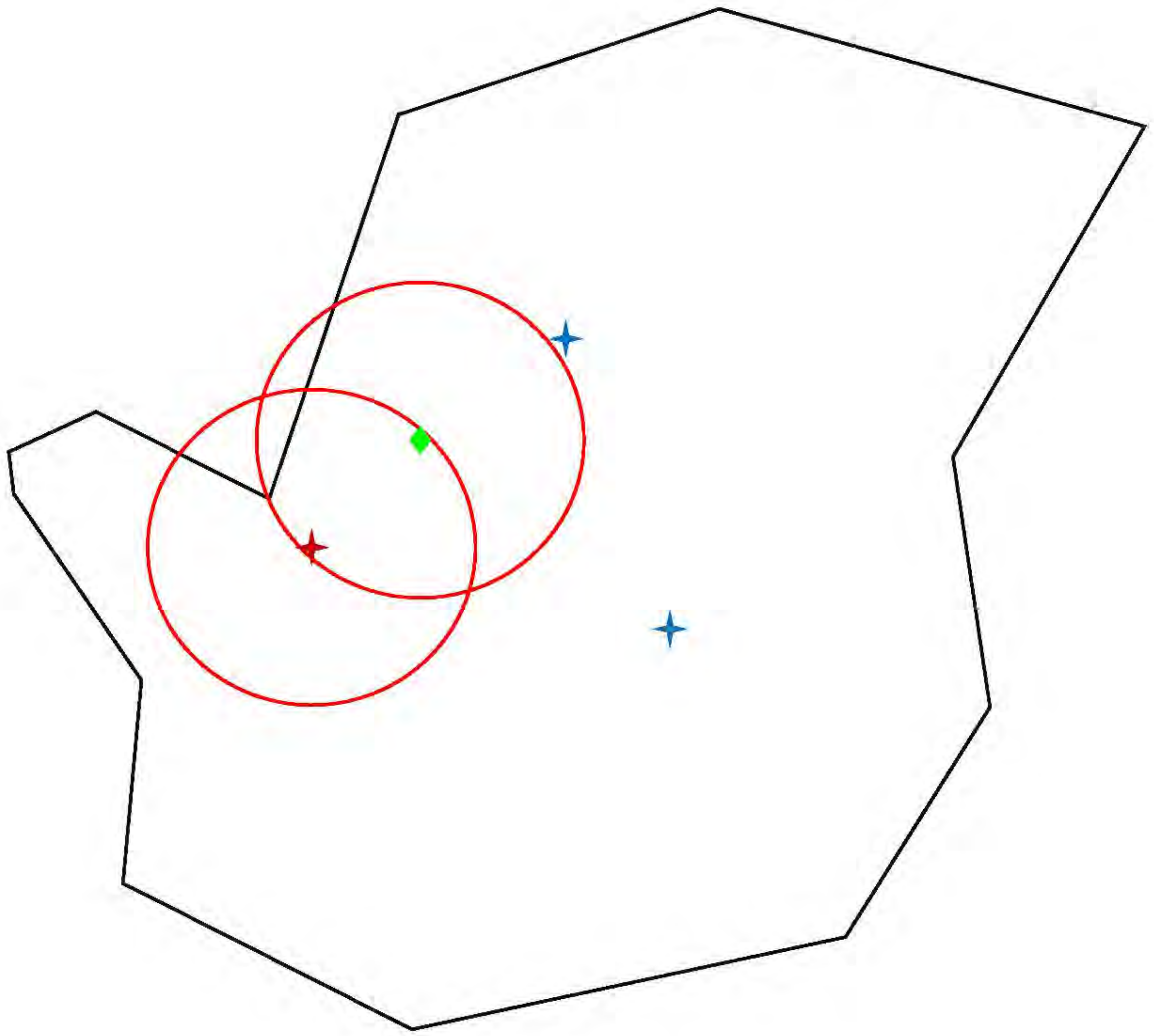
- Black Outline: PHMA associated with a PAC (for Utah, this is our “Biologically Significant Area”). For the purposes of this exercise, we’ll assume it is 250,000 acres.
- Green Diamond: Proposed area of physical disturbance related to the project.
- Blue Stars: Occupied Greater Sage-Grouse Leks
- Purple “stuff”: Existing disturbance from the 12 degradation threats.
- Red Circle: Four-mile project boundary
- Blue Circles: Four-mile lek boundaries



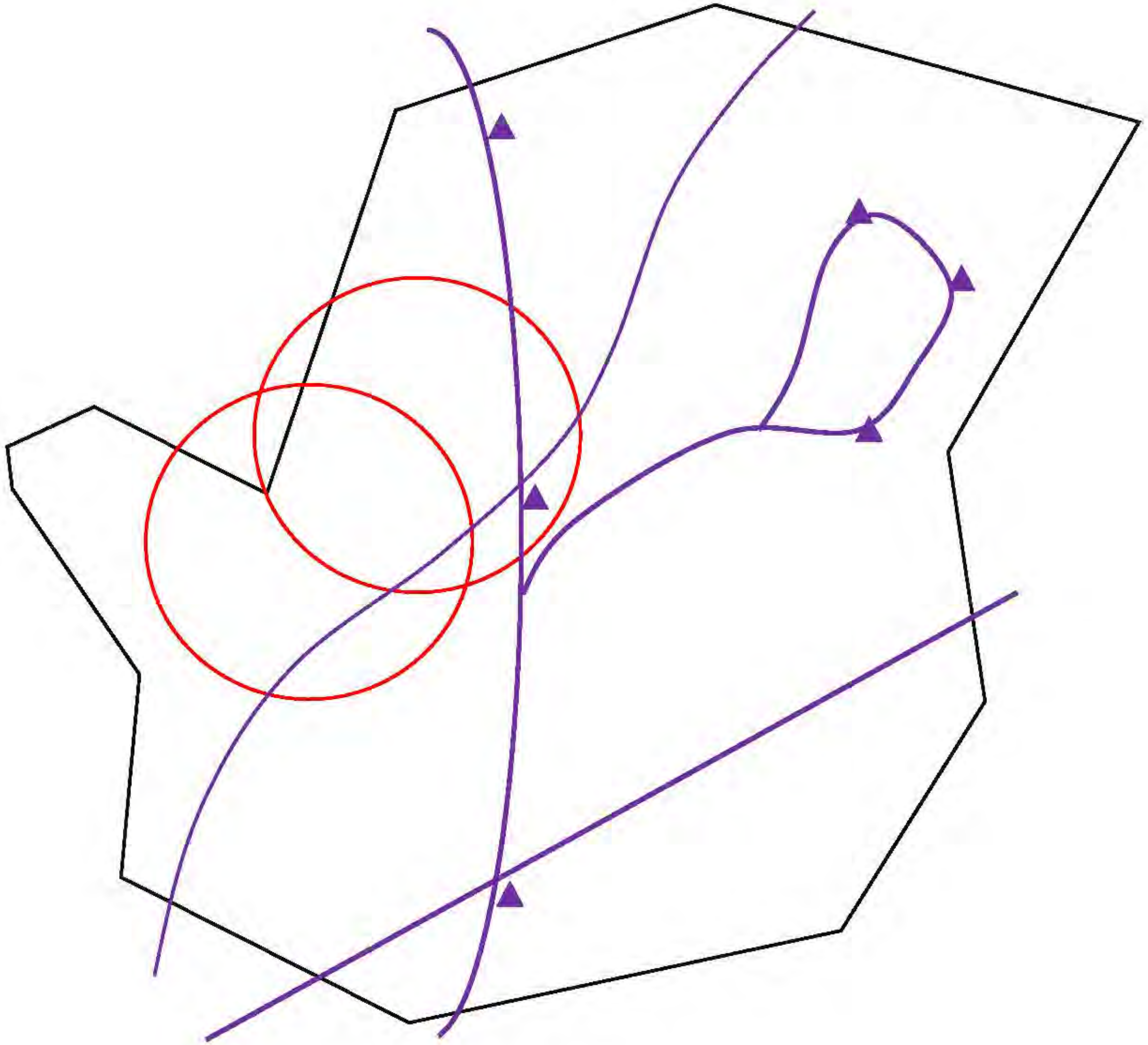
1) Determine potentially affected occupied leks by placing a four mile boundary around the proposed area of physical disturbance related to the project. All occupied leks located within the four mile project boundary and within PHMA will be considered affected by the project.



2) Next, place a four mile boundary around each of the affected occupied leks.



3) The PHMA within the four mile lek boundary and the four mile project boundary creates the project analysis area for each individual project. If there are no occupied leks within the four-mile project boundary, the project analysis area will be that portion of the four-mile project boundary within the Priority Habitat Management Area. For the purposes of this scenario, we'll assume that there are approximately 51,500 acres within the two circles. Approximately 6,500 acres of these circles fall outside the PHMA (black line), leaving us with 45,000 acres in our project analysis area.



4) Map disturbances or use locally available data. Use of NAIP imagery is recommended.

For the purposes of this scenario, we'll assume the following existing disturbances in the biological significant unit:

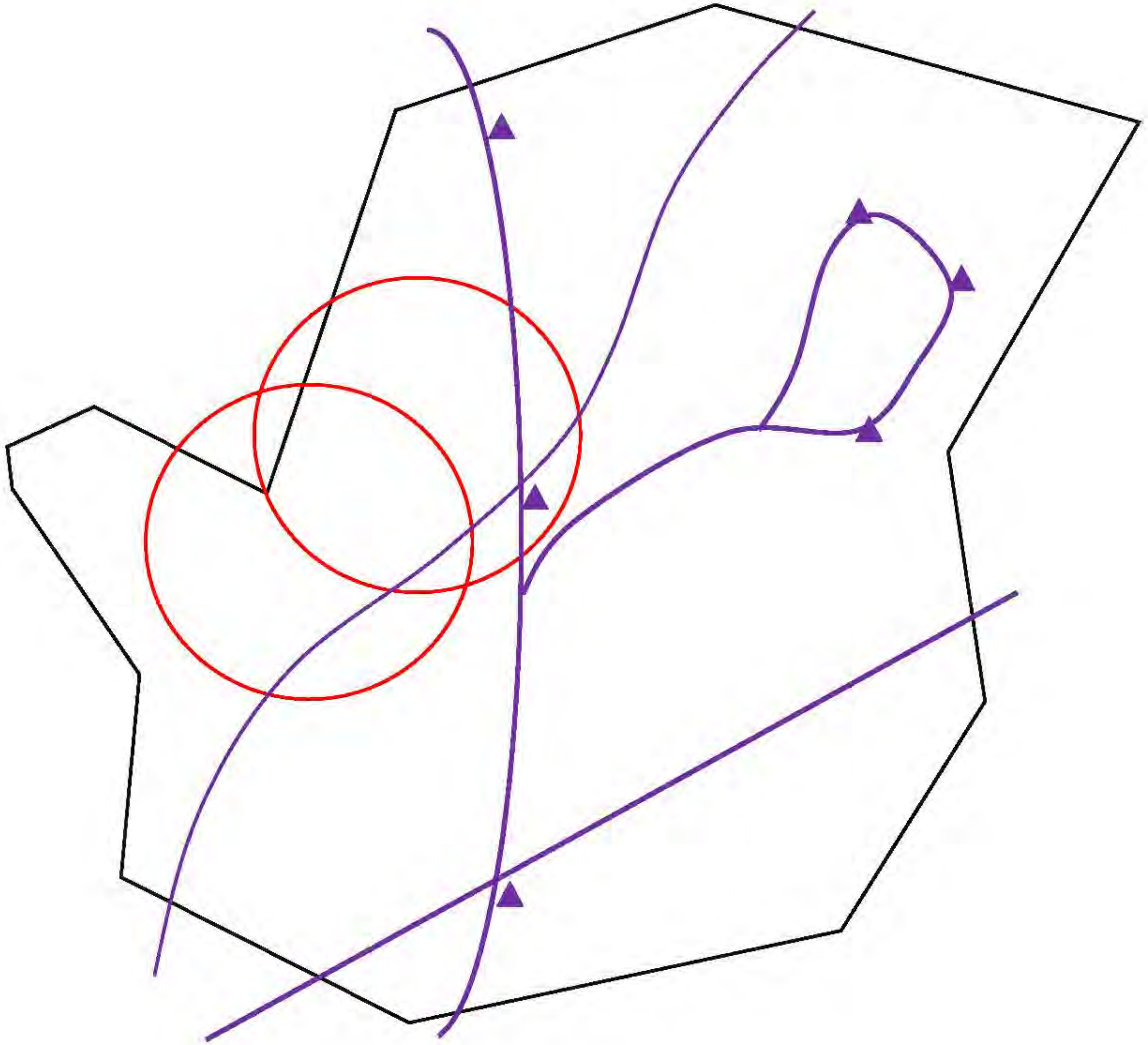
- 10 miles of railroad = 40 acres
- 14 miles of class B county road = 136 acres
- 18 miles of 2 collocated powerlines = 400 acres
- 15 miles of a 1.5 lane dirt road = 33 acres
- 3 wellpads = 20 acres
- 2 large mineral material pits = 600 acres
- 1 hardrock mine = 1,000 acres

Total disturbance = 2,229 acres

Within the project analysis area, assumed disturbance is as follows:

- 3 miles of class B county road = 30 acres
- 3 miles of 2 collocated powerlines = 65 acres
- 1 hardrock mine = 1,000 acres

Total disturbance = 1,095 acres



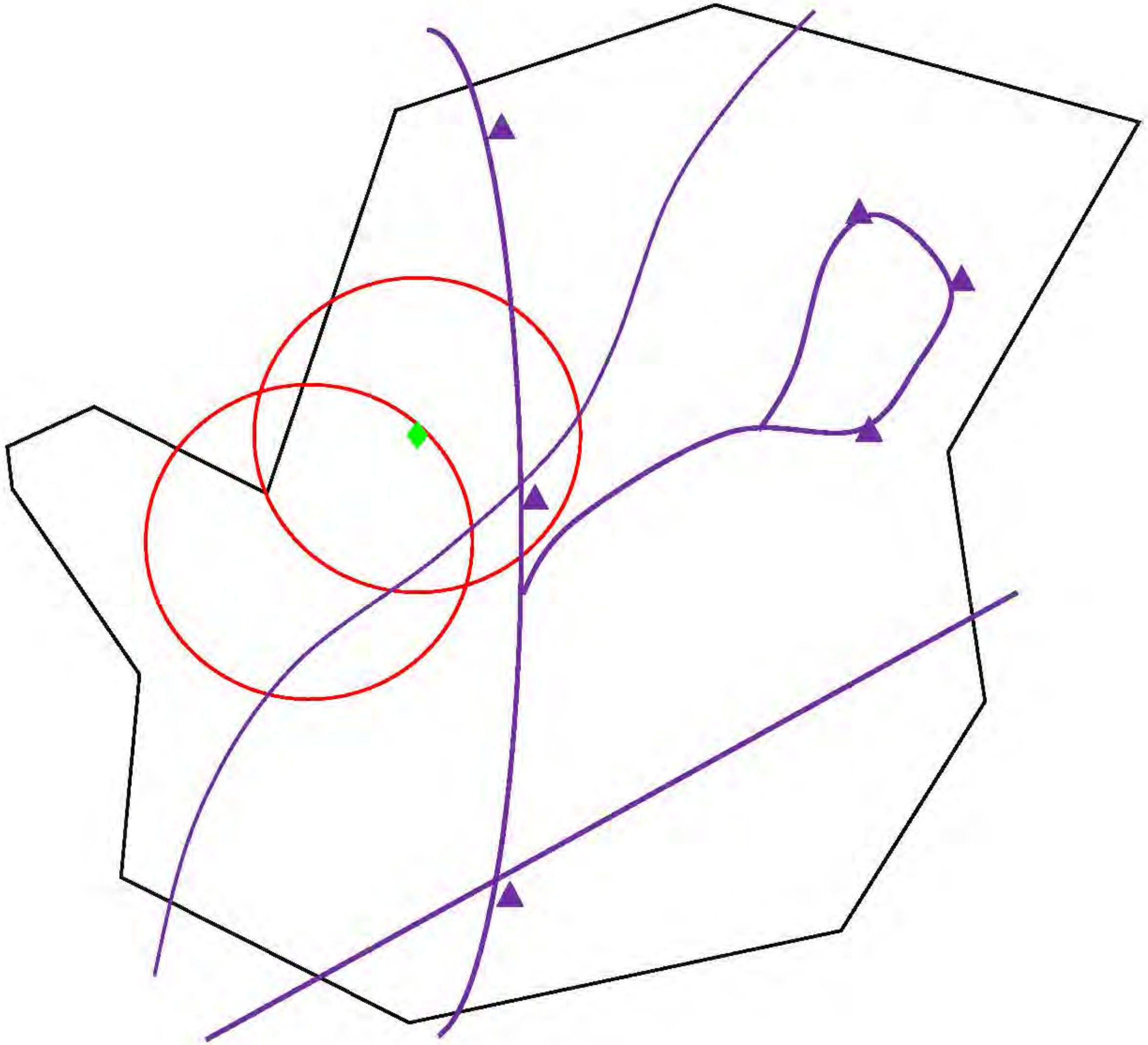
5) Calculate percent existing disturbance using the disturbance calculation formula. If existing disturbance is less than 3%, proceed to next step. If existing disturbance is greater than 3%, defer the project.

For the BSU:
% Degradation Disturbance = (combined acres of the 12 degradation threats*) ÷ (acres of all lands within the PHMAs in a BSU) x 100.

2,229 ÷ 250,000 x 100 = 0.89%

For the project analysis area:
% Degradation Disturbance = (combined acres of the 12 degradation threats[1] plus the 7 site scale threats[2]) ÷ (acres of all lands within the project analysis area in the PHMA) x 100.

1,095 ÷ 45,000 x 100 = 2.43%



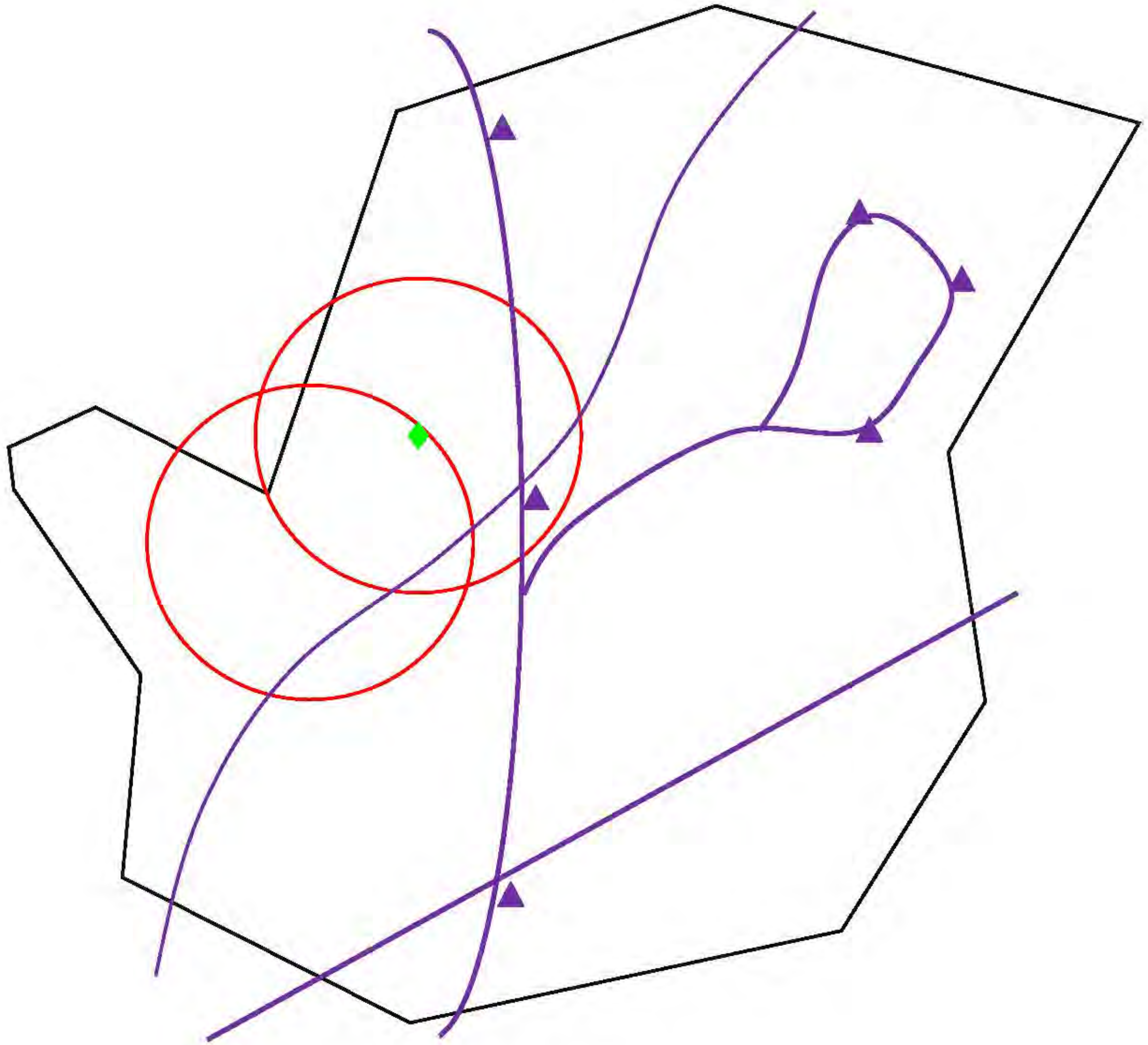
6) Add proposed project disturbance footprint area and recalculate the percent disturbance. If disturbance is less than 3%, proceed to next step. If disturbance is greater than 3%, defer project.

For the purposes of this scenario, we'll assume the project will result in the following additional disturbance:

- New development complex with communication sites complex, mineral material site, and staging area (100 acres).

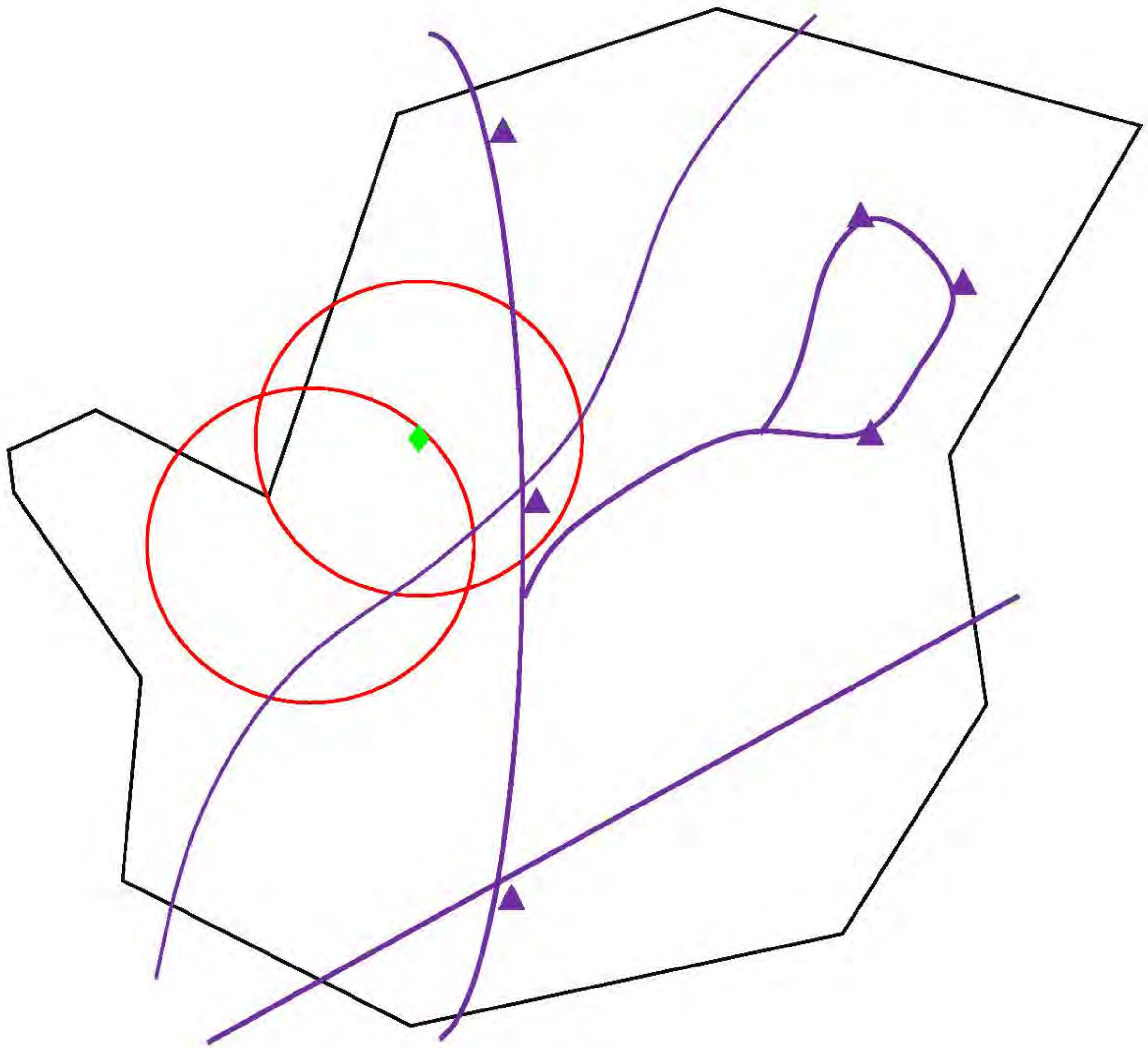
For the BSU:
(2,229 + 100) ÷ 250,000 x 100 = 0.93%

For the project analysis area:
(1,095 + 100) ÷ 45,000 x 100 = 2.66%

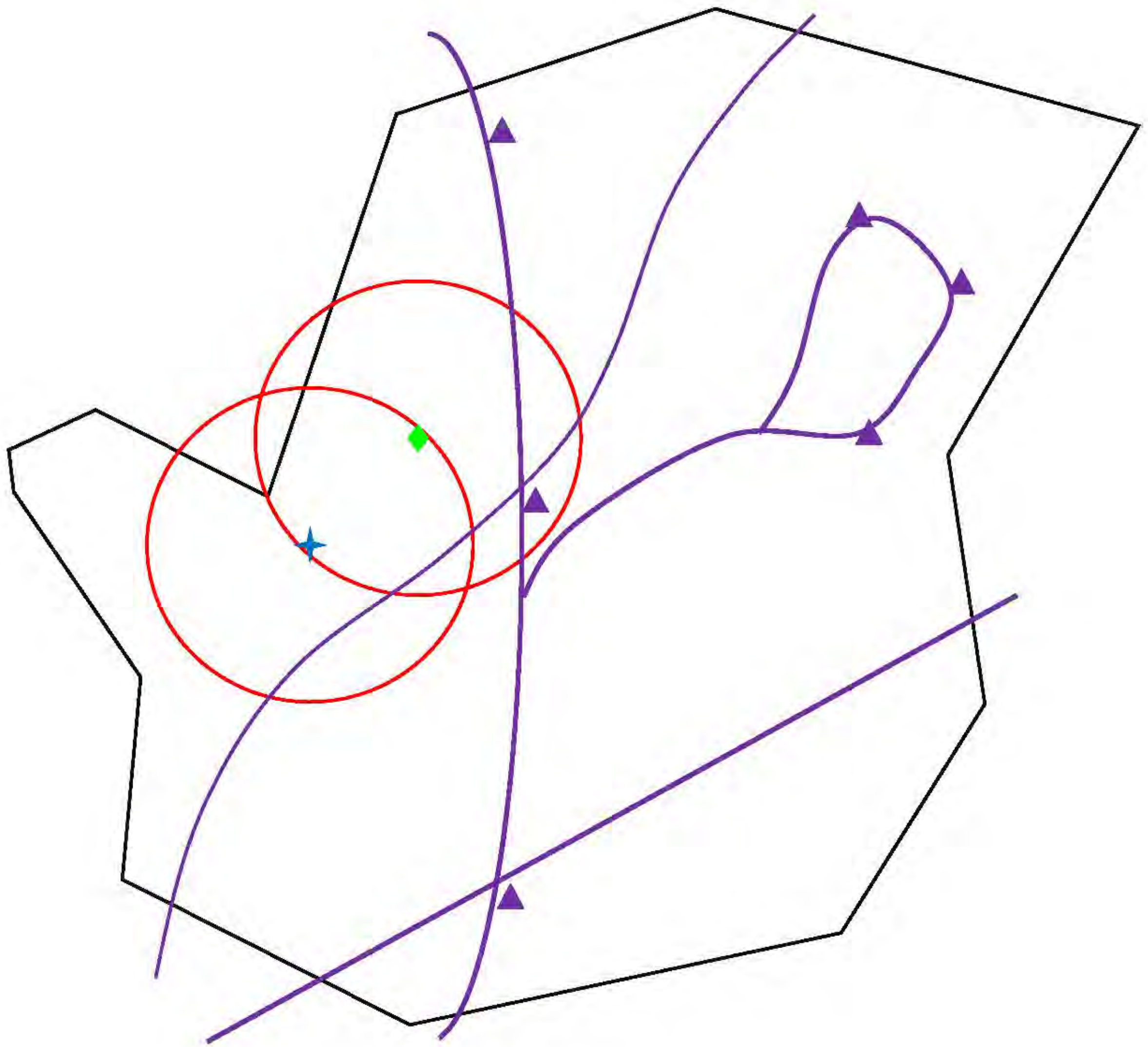


7) Calculate the disturbance density of energy and mining facilities. If the disturbance density is less than 1 facility per 640 acres, averaged across project analysis area, proceed to the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density is greater than 1 facility per 640 acres, averaged across the project analysis area, either defer the proposed project or co-locate it into existing disturbed area.

For this scenario, I don't have this. We'll assume we're good to go for this criteria.



8) If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, fully disclose the local and regional impacts of the proposed action in the associated NEPA.



Key points to remember:

- The disturbance cap applies ONLY to PHMA. If a portion of the project analysis area is outside PHMA, the denominator will decrease.
- The disturbance cap is calculated regardless of land ownership. While the BLM/FS can only make decisions on the lands which we administer, we do take into account impacts from adjacent lands.
- The disturbance cap does not differentiate between habitat and non-habitat within the biologically significant unit or project analysis area. It applies equally to all types of vegetation.

BLM-UTAH

Greater Sage-Grouse Planning Issues for the BLM Planning Teams to Insert and Analyze in Administrative Draft Proposed Plan (ADPP)

January 30, 2015

The March 4, 2010 decision by the U.S. Fish and Wildlife Service that the greater sage-grouse warranted listing but was precluded [Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to list the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered] *set in motion the most comprehensive land-use planning initiative in the BLM's history.*

In 2011, the BLM began updating land-use plans across the West so as to ensure not only the long-term viability of the greater sage-grouse on public lands and the continued economic vitality of the West. This has been a complex and demanding process involving collaboration with an unprecedented number of stakeholders, including Governors, State Fish and Game agencies, the U.S. Fish and Wildlife Service and many others. The BLM's mandate of multiple use and sustained yield has required us to balance the full range of resource uses on public lands, including the conservation of crucial wildlife habitat. As we have worked through this process, public land managers throughout the BLM have made difficult resource management decisions.

These documents provide key guidance that will enable the BLM to finalize land use plans that will contribute to the conservation of the Greater Sage-Grouse and other sagebrush associated species across the West. The guidance outlines a suite of tools, such as disturbance limits in key habitats and mitigation approaches, which will help us to reach this goal. These mechanisms will work in concert to conserve sage-grouse habitat so that we can achieve our twin goals of thriving Greater Sage-Grouse populations and robust Western economies.

Issue: **Development in Highly Important Landscapes**

Direction: As more specifically provided in this guidance, the ADPP will include Sagebrush Focal Areas (SFA), consisting of the BLM-managed lands within the area depicted in the October 27, 2014 USFWS memo, *Greater Sage-Grouse: Additional Recommendation to Refine Land Use Allocations in Highly Important Landscapes*. In the Special Status Species Section of Chapter 2, include the following management action drop in language (for the Proposed Plan only):

"Designate Sagebrush Focal Areas (SFA) as shown on Map X (x acres). SFAs will be managed as PHMA, with the following additional management:

1) *Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights.*
2) *Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.*

3) *Prioritized for management and conservation actions in these areas, including, but not limited to review of livestock grazing permits/leases (see livestock grazing section for additional actions)."*

The ADPPs will also reiterate the relevant SFA decisions in the locatable minerals, fluid minerals, and livestock grazing sections of Chapter 2.

<u>The NOC will provide updated shapefiles that delineate the SFAs.</u>

Except as otherwise provided below, the ADPP will provide that all BLM- and FS-managed lands (including subsurface) within SFAs will be allocated and managed as PHMA and include the management actions above.

- *Do Not Include the following in SFA Management:*
    - Wilderness Study Areas (WSAs) in non-habitat within the SFAs have current management which is generally protective of GRSG. These will continue to be managed so as not to impair their suitability for preservation as wilderness.
        - To the extent that these areas were analyzed for contingent management as general or priority habitat, the ADPP will include contingent allocations and management direction that would apply in the event that Congress releases the areas from WSA status.
- *Do Not Include Other Agency Land in SFA Management* –while lands managed by other agencies will be shown on the SFA maps, BLM ADPP decisions will not be applied to them.
- *Northern Monte Cristo Range (FS-UT)* – this area will be treated as PHMA, with the SFA management actions for this FS-land.
- *Do Not Include Private/State Lands in SFA Management* – while private/state lands may be within the SFA boundaries, ADPP decisions will not be applied to them, but may apply to federal subsurface underlying such lands as provided below.
- *Subsurface Estate:*
    - Under private/state lands: subsurface estate identified as PHMA or GHMA in the DEIS should be treated as PHMA with SFA management actions. The subsurface estate located within the Northern Monte Cristo Range (FS-UT) will be managed as PHMA, with the SFA management actions.
    - Under other Federal lands: subsurface estate should be treated as PHMA with SFA management actions if it is not already withdrawn (such as in Refuges or Parks) and PHMA or GHMA management was analyzed in the DEIS.

Additional direction/drop in language for the ADPPs regarding SFAs will be forthcoming.

Issue: **Mitigation**

Direction: The ADPP will include the updated Mitigation Framework (Attachment I) and drop-in Chapter 2 language to reflect the following language:

"In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions."

Issue: **Mapping**

Direction: BLM-UT will not manage non-habitat (Opportunity Areas) as PHMA, as this was not analyzed in the DEIS and would require NEPA supplementation. In these areas, BLM-UT will apply the most restrictive management analyzed in their DEIS. Concerning the West Tavaputs area, a 3.1-mile area around the leks will be managed as PHMA, with the remainder of the area managed as GHMA.

Issue: **Disturbance**

Direction: Per the original April 2014 NPT guidance on disturbance, the ADPP will use the 3% disturbance cap at the Biologically Significant Unit (BSU) and project scale. The density calculation (an average of 1 facility per 640 acres) applies to energy and mining facilities. The disturbance cap will not be applied to foreclose development of locatable minerals on unpatented claims located under the 1872 Mining Law; the disturbance from locatable mining will be accounted for in determining the percent disturbance and whether the cap has been exceeded. See Attachment II for appropriate scales and methodology for calculating disturbance and recommended drop-in language. Planning units will include the following land use plan actions within their ADPPs that states:

a. *If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG Priority Habitat Management Areas in any given Biologically Significant Unit, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG Priority*

Habitat Management Areas in any given Biologically Significant Unit until the disturbance has been reduced to less than the cap.

b. *If the 3% disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a Priority Habitat Management Areas, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.).*

Issue: **Vegetation Objectives**

Direction: The ADPP will establish and incorporate vegetation and GRSG habitat objectives (see Attachment III for specific guidance and a GRSG Habitat Objectives Table template that follows the Sage-Grouse Habitat Assessment Framework Technical Reference-6710-1). The vegetation and GRSG habitat objectives guidance states that the values for the desired conditions in the GRSG Habitat Objectives Table are to be used, at a minimum, to meet the applicable land health standard in sage-grouse habitats. Planning units may include additional indicators and desired condition values as appropriate. The desired condition value for each indicator can be a range of values rather than a single value (e.g., the value for the desired condition for sagebrush canopy cover in breeding and nesting habitat could be 15-25%).

The GRSG Habitat Objectives table is to be placed in the Special Status Species section of the ADPP. The vegetation objective should be placed in the Vegetation section of the ADPP. Planning units will include the following land use plan vegetation objective within the Vegetation section of their ADPPs:
In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).

Issue: **Livestock Grazing**

Direction: The following management actions will be included in the Livestock Grazing section of the ADPP.

- *The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFAs) followed by PHMAs outside of the SFAs. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas,* *including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.*

- *The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFAs and PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table and/or Land Health Standards (43 CFR 4180.2) and defined responses that will allow the authorizing officer to make adjustments to livestock grazing without conducting additional NEPA.*
- *Allotments within SFAs, followed by those within PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.*
- *At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives.*

Attachment IV provides guidance as to how the BLM will incorporate GRGS decisions from the Sage-Grouse RMP/Amendments into grazing permits/leases.

Issue: **Mineral Materials (Salable Minerals)**

Direction: As directed in the NPT guidance, all Priority Habitat Management Areas will be closed to new mineral materials development.

The following management action will be applied to the ADPP:
"PHMAs are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:

- *the activity is within the Biologically Significant Unit (BSU) and project area disturbance cap;*
- *the activity is subject to the provisions set forth in the mitigation framework [Appendix X];*
- *all applicable required design features are applied; and [if applicable] the activity is permissible under the specific sub-regional screening criteria [site location in ADPP where this screening process is present]."*

Issue: **High-voltage Transmission and Major Pipeline ROWs and Corridors**

Direction: 1) Apply the recommended NPT allocation guidance for PHMA of avoidance.

2) GHMA will remain open because of the limited number of birds in General Habitat Management Areas.

3) For sub-regions that have planned priority transmission lines that traverse their planning area (Gateway West, Boardman to Hemingway, and TransWest Express, including those portions of Gateway South that are co-located), apply the following language as a management action in the ADPP:
"Priority Habitat Management Areas (PHMAs) are designated as avoidance areas for high voltage transmission line ROWs. All authorizations in these areas, other than the excepted projects, must comply with the conservation measures outlined in this proposed plan, including the RDFs and avoidance criteria presented in [insert citation here] of this document. The BLM is currently processing an application for [Insert name of transmission project] and the NEPA review for this project is well underway. The BLM is analyzing GRSG mitigation measures through the project's NEPA review process."

Issue: **Coal Suitability**

Direction: Sub-regions will include the following management action:
"At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1)."

Issue: **Fluid Mineral Resources (Including Geothermal)**

Direction: The ADPP will include the following as a conservation objective:

"Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h)."

"Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to sage-grouse or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases."

Issue: **No Surface Occupancy (NSO) Exception Language**

Direction: Follow NPT guidance for Priority Habitat Management Areas. No-surface-occupancy stipulations will be included in new fluid mineral leases at the time of leasing only and may not be applied to existing fluid mineral leases that did not include no-surface-occupancy stipulation at the time of leasing. Include the following language into the ADPP:

No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:

(i) Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or,
(ii) Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.

Exceptions based on conservation gain (ii) may only be considered in (a) PHMAs of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP [revision or amendment]. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.

Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may *be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly."*

Issue: **Adaptive Management**

Direction: Follow the NPT Adaptive Management Guidance and Sideboards. When a hard trigger is hit in a BSU, the designated response will be put in place in that BSU. Triggers and responses have been developed with local state and FWS experts.

When a hard trigger is hit in a BSU within a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the causal factor, put project level responses in place, as appropriate and discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs within the PAC and will invoke the appropriate plan response. Adoption of any further actions at the plan level may require initiating a plan amendment process.

Issue: **Application of Lek Buffers**

Direction: The ADPP will require the use of lek buffer-distances for all new BLM-managed and BLM-authorized anthropogenic disturbances in both GHMA and PHMA (see Attachment V) through this drop-in Chapter 2 language:

"In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239*) in accordance with Appendix X."*

Allocation Direction

	Utah
Solar - Priority	Exclusion
Solar – General	Exclusion
Wind – Priority	Exclusion
Wind – General	Open
HV Transmission Lines and Large Pipeline ROWs - Priority	Avoidance
HV Transmission Lines and Large Pipeline ROWs - General	Open
Minor ROWs – Priority	Avoidance
Minor ROWs – General	Open
Fluids – Priority	NSO
Fluids – General	Open with Standard Constraints
Non-energy Leasables - Priority	Closed
Non-energy Leasables - General	Open
Mineral Materials – Priority	Closed
Mineral Materials – General	Open

Attachment I

GREATER SAGE-GROUSE RMPA/FEIS
TEMPLATE LANGUAGE FOR ADDRESSING
MITIGATION

[🟩] = Instructions
[🟨] = Fill in the blank

[This mitigation language addresses greater sage-grouse. However, if you are working on a plan revision, you may need to add additional language to be more inclusive of other resource and value objectives (e.g. cultural resources, national historic trails, recreation values, other special status species) that may need to be mitigated.]

Chapter 1 - Introduction

[Nothing new to add to EIS]

Chapter 2 – Alternatives – [Proposed Plan/Proposed Plan Amendment]

- Add these two new sections (below) to the **Chapter 2 Alternatives** section.
- Replace the Regional Mitigation placeholder language that was included in the draft EIS with the new "Mitigation" section, below.
- Ensure a degree of consistency between this nationally standardized language and that found in the rest of the EIS.
- Fine tune this language, if necessary, but maintain consistency with the other BLM/USFS plan amendments.
- Remove references to USFS for plans that do not address US Forest Service lands

Consistent with the proposed plan's goal outlined in [Table 2-X – Description of Alternatives], the intent of the [Proposed Plan/Proposed Plan Amendment] is to provide a net conservation gain to the species. To do so, in undertaking BLM/USFS management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and assure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. This is also consistent with BLM Manual 6840 – Special Status Species Management, Section .02B, which states "to initiate protective conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of the need for listing of these species under the ESA."

Mitigation

Mitigation Standards. In undertaking BLM/USFS management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and assure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM/USFS management actions and authorized third party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in Appendix X).

Greater Sage-Grouse Conservation Team. The BLM/USFS will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of greater sage-grouse, within 90 days of the issuance of the Record of Decision. This Team will develop a WAFWA Management Zone Regional Mitigation Strategy (hereafter, Regional Mitigation Strategy). The Team will also compile and report on monitoring data (including data on habitat condition, population trends, and mitigation effectiveness) from States across the WAFWA Management Zone (see Monitoring section). Subsequently, the Team will use these data to either modify the appropriate Regional Mitigation Strategy or recommend adaptive management actions (see Adaptive Management section).

The BLM/USFS will invite governmental and Tribal partners to participate in this Team, including the State Wildlife Agency and U.S. Fish and Wildlife Service, in compliance with the exemptions provided for committees defined in the Federal Advisory Committee Act and the regulations that implement that act. The BLM/USFS will strive for a collaborative and unified approach between Federal agencies (e.g. FWS, BLM, and USFS), Tribal governments, state and local government(s), and other stakeholders for greater sage-grouse conservation. The Team will provide advice, and will not make any decisions that impact Federal lands. The BLM/USFS will remain responsible for making decisions that affect Federal lands.

Developing a Regional Mitigation Strategy. The Team will develop a Regional Mitigation Strategy to inform the mitigation components of NEPA analyses for BLM/USFS management actions and third party actions that result in habitat loss and degradation. The Strategy will be developed within one year of the issuance of the Record of Decision. The BLM's Regional Mitigation Manual MS-1794 will serve as a framework for developing the Regional Mitigation Strategy. The Regional Mitigation Strategy will be applicable to the States/Field Offices/Forests within the WAFWA Management Zone's boundaries.

Regional mitigation is a landscape-scale approach to mitigating impacts to resources. This involves anticipating future mitigation needs and strategically identifying mitigation sites and measures that can provide a net conservation gain to the species. The Regional Mitigation Strategy developed by the Team will elaborate on the components identified above (i.e.

avoidance, minimization, and compensation; additionality, timeliness, and durability) and further explained in Appendix [X].

In the time period before the Strategy is developed, BLM will consider regional conditions, trends, and sites, to the greatest extent possible, when applying the mitigation hierarchy and will ensure that mitigation is consistent with the standards set forth in the first paragraph of this section.

Incorporating the Regional Mitigation Strategy into NEPA Analyses. The BLM/USFS will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM/USFS management actions and third party actions that result in habitat loss and degradation and the appropriate mitigation actions will be carried forward into the decision.

Implementing a Compensatory Mitigation Program. Consistent with the principles identified above, the BLM/USFS need to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. In order to align with existing compensatory mitigation efforts, this compensatory mitigation program will be implemented at a State-level (as opposed to a WAFWA Management Zone, a Field Office, or a Forest), in collaboration with our partners (e.g. Federal, Tribal, and State agencies).

To ensure transparent and effective management of the compensatory mitigation funds, the BLM/USFS will enter into a contract or agreement with a third-party to help manage the State-level compensatory mitigation funds, within one year of the issuance of the Record of Decision. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM/USFS will remain responsible for making decisions that affect Federal lands.

Chapter 3 – Affected Environment

[Nothing to add]

Chapter 4 – Environmental Consequences – [Proposed Plan/Proposed Plan Amendment]

Mitigation

This Chapter describes the environmental consequences associated with the impacts to greater sage-grouse and its habitat from activities carried out in conformance with this plan, in addition to BLM/USFS management actions. In undertaking BLM/USFS management actions, and consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM/USFS will require mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. In addition, to help implement this [Proposed Plan / Proposed Plan Amendment], a WAFWA Management Zone Regional Mitigation Strategy (per Appendix [X]) will be developed within one year of the issuance of the Record of Decision. The Strategy will elaborate on the components identified in Chapter 2 (avoidance, minimization, compensation, additionality, timeliness, and durability), and will be considered by the BLM/USFS for BLM/USFS management actions and third party actions that result in habitat loss and degradation. The implementation of a Regional Mitigation Strategy will benefit greater sage-grouse, the public, and land-users by providing a reduction in threats, increased public transparency and confidence, and a predictable permit process for land-use authorization applicants.

Appendix [X]

- Add this new **Appendix.**
- Ensure a degree of consistency between this nationally standardized language and that found in the rest of the EIS.
- Fine tune this language, if necessary, but maintain consistency with the other BLM/USFS plan amendments.
- Remove references to USFS for plans that do not address US Forest Service lands

Appendix (X) – Mitigation – [Proposed Plan/Proposed Plan Amendment]

General

In undertaking BLM/USFS management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM/USFS will require and assure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM/USFS management actions and authorized third party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation (see glossary).

The BLM/USFS, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for BLM/USFS management actions and third party actions that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to greater sage-grouse habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to greater sage-grouse and its habitat.

The BLM's Regional Mitigation Manual MS-1794 serves as a framework for developing and implementing a Regional Mitigation Strategy. The following sections provide additional guidance specific to the development and implementation of a WAFWA Management Zone Regional Mitigation Strategy.

Developing a WAFWA Management Zone Regional Mitigation Strategy

The BLM/USFS, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy to guide the application of the mitigation hierarchy for BLM/USFS management actions and third party actions that result in habitat loss and degradation. The Strategy should consider any State-level greater sage-grouse mitigation guidance that is consistent with the requirements identified in this Appendix. The Regional Mitigation Strategy should be developed in a transparent manner, based on the best science available and standardized metrics.

As described in Chapter 2, the BLM/USFS will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of greater sage-grouse, within 90 days of the issuance of the Record of Decision. The Strategy will be developed within one year of the issuance of the Record of Decision.

The Regional Mitigation Strategy should include mitigation guidance on avoidance, minimization, and compensation, as follows:

- Avoidance
  - Include avoidance areas (e.g. right-of-way avoidance/exclusion areas, no surface occupancy areas) already included in laws, regulations, policies, and/or land use plans (e.g. Resource Management Plans, Forest Plans, State Plans); and,
  - Include any potential, additional avoidance actions (e.g. additional avoidance best management practices) with regard to greater sage-grouse conservation.
- Minimization
  - Include minimization actions (e.g. required design features, best management practices) already included in laws, regulations, policies, land use plans, and/or land-use authorizations; and,
  - Include any potential, additional minimization actions (e.g. additional minimization best management practices) with regard to greater sage-grouse conservation.
- Compensation
  - Include discussion of impact/project valuation, compensatory mitigation options, siting, compensatory project types and costs, monitoring, reporting, and program administration. Each of these topics is discussed in more detail below.
    - Residual Impact and Compensatory Mitigation Project Valuation Guidance
      - A common standardized method should be identified for estimating the value of the residual impacts and value of the compensatory mitigation projects, including accounting for any uncertainty associated with the effectiveness of the projects.

    - This method should consider the quality of habitat, scarcity of the habitat, and the size of the impact/project.
    - For compensatory mitigation projects, consideration of durability (see glossary), timeliness (see glossary), and the potential for failure (e.g. uncertainty associated with effectiveness) may require an upward adjustment of the valuation.
    - The resultant compensatory mitigation project will, after application of the above guidance, result in proactive conservation measures for Greater Sage-grouse (consistent with BLM Manual 6840 – Special Status Species Management, section .02).
- Compensatory Mitigation Options
    - Options for implementing compensatory mitigation should be identified, such as:
        - Utilizing certified mitigation/conservation bank or credit exchanges.
        - Contributing to an existing mitigation/conservation fund.
        - Authorized-user conducted mitigation projects.
    - For any compensatory mitigation project, the investment must be additional (i.e. additionality: the conservation benefits of compensatory mitigation are demonstrably new and would not have resulted without the compensatory mitigation project).
- Compensatory Mitigation Siting
    - Sites should be in areas that have the potential to yield a net conservation gain to the greater sage-grouse, regardless of land ownership.
    - Sites should be durable (see glossary).
    - Sites identified by existing plans and strategies (e.g. fire restoration plans, invasive species strategies, healthy land focal areas) should be considered, if those sites have the potential to yield a net conservation gain to greater sage-grouse and are durable.
- Compensatory Mitigation Project Types and Costs
    - Project types should be identified that help reduce threats to greater sage-grouse (e.g. protection, conservation, and restoration projects).
    - Each project type should have a goal and measurable objectives.
    - Each project type should have associated monitoring and maintenance requirements, for the duration of the impact.
    - To inform contributions to a mitigation/conservation fund, expected costs for these project types (and their monitoring and maintenance), within the WAFWA Management Zone, should be identified.
- Compensatory Mitigation Compliance and Monitoring
    - Mitigation projects should be inspected to ensure they are implemented as designed, and if not, there should be methods to enforce compliance.
    - Mitigation projects should be monitored to ensure that the goals and objectives are met and that the benefits are effective for the duration of the impact.

- Compensatory Mitigation Reporting
    - Standardized, transparent, scalable, and scientifically-defensible reporting requirements should be identified for mitigation projects.
    - Reports should be compiled, summarized, and reviewed in the WAFWA Management Zone in order to determine if greater sage-grouse conservation has been achieved and/or to support adaptive management recommendations.
- Compensatory Mitigation Program Implementation Guidelines
    - Guidelines for implementing the State-level compensatory mitigation program should include holding and applying compensatory mitigation funds, operating a transparent and credible accounting system, certifying mitigation credits, and managing reporting requirements.

Incorporating the Regional Mitigation Strategy into NEPA Analyses

The BLM/USFS will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM/USFS management actions and third party actions that result in habitat loss and degradation and the appropriate mitigation actions will be carried forward into the decision.

Implementing a Compensatory Mitigation Program

The BLM/USFS need to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. In order to align with existing compensatory mitigation efforts, this compensatory mitigation program will be managed at a State-level (as opposed to a WAFWA Management Zone, a Field Office, or a Forest), in collaboration with our partners (e.g. Federal, Tribal, and State agencies).

To ensure transparent and effective management of the compensatory mitigation funds, the BLM/USFS will enter into a contract or agreement with a third-party to help manage the State-level compensatory mitigation funds, within one year of the issuance of the Record of Decision. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM/USFS will remain responsible for making decisions that affect Federal lands.

Glossary Terms

Additionality: The conservation benefits of compensatory mitigation are demonstrably new and would not have resulted without the compensatory mitigation project. (adopted and modified from BLM Manual Section 1794).

Avoidance mitigation: Avoiding the impact altogether by not taking a certain action or parts of an action. (40 CFR 1508.20(a)) (e.g. may also include avoiding the impact by moving the proposed action to a different time or location.)

Compensatory mitigation: Compensating for the (residual) impact by replacing or providing substitute resources or environments. (40 CFR 1508.20)

Compensatory mitigation projects: The restoration, creation, enhancement, and/or preservation of impacted resources (adopted and modified from 33 CFR 332), such as on-the-ground actions to improve and/or protect habitats (e.g. chemical vegetation treatments, land acquisitions, conservation easements). (adopted and modified from BLM Manual Section 1794).

Compensatory mitigation sites: The durable areas where compensatory mitigation projects will occur. (adopted and modified from BLM Manual Section 1794).

Durability (protective and ecological): the maintenance of the effectiveness of a mitigation site and project for the duration of the associated impacts, which includes resource, administrative/legal, and financial considerations. (adopted and modified from BLM Manual Section 1794).

Minimization mitigation: Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (40 CFR 1508.20 (b))

Residual impacts: Impacts that remain after applying avoidance and minimization mitigation; also referred to as unavoidable impacts.

Timeliness: The lack of a time lag between impacts and the achievement of compensatory mitigation goals and objectives (BLM Manual Section 1794).

Attachment II

Greater Sage-Grouse (GRSG) Land Use Plans
Disturbance Caps Guidance

Purpose

I. Provide the planning units with land use planning actions that need to be incorporated into the administrative draft proposed plans to respond to the 3% disturbance cap once it is exceeded in either the Biologically Significant Units (BSU) or at the project scale.
II. Provide guidance on the use of the west-wide habitat degradation (disturbance) data layers as well as the use of locally collected disturbance data for BSUs to determine if the disturbance cap has been exceeded as the land use plans (LUP) are being implemented.
III. Provide guidance on the use of locally collected disturbance data for project authorizations to determine if the disturbance cap has been exceeded as the LUPs are being implemented.
IV. Provide guidance on the inclusion of fire in disturbance calculations.
V. Provide guidance on the use of the density of energy and mining facilities during authorizations
VI. Provide guidance on the use of the BER analysis in the land use plans (Chapter 2, Affected Environment) and the use of the "west-wide" sagebrush availability and habitat degradation data/estimates for the Priority Habitat Management Areas in each population for monitoring and management purposes as the LUPs are being implemented.
VII. Provide guidance on what is considered in the disturbance calculations versus what is considered for the disturbance cap.

Guidance

I. Planning units will include the following land use plan actions within their administrative draft proposed land use plans (ADPPs) that states:
    a. *If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG Priority Habitat Management Areas in any given Biologically Significant Unit, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG Priority Habitat Management Areas in any given Biologically Significant Unit until the disturbance has been reduced to less than the cap.*
    b. *If the 3% disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a Priority Habitat Management Areas, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain*

the area under the cap (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.).

II. Use of west-wide habitat degradation data as well as the use of locally collected disturbance data to determine the level of existing disturbance:

   a) In the GRSG Priority Habitat Management Areas in any given Biologically Significant Unit, use the west-wide data at a minimum and/or locally collected disturbance data as available (e.g., DDCT) for the anthropogenic disturbance types listed in Table 1.

III. Use of locally collected disturbance data for project authorizations:

   a) In a proposed project analysis area, digitize all existing anthropogenic disturbances identified in the GRSG Monitoring Framework and the 7 additional features that are considered threats to sage-grouse (Table 2). Using 1 meter resolution NAIP imagery is recommended. Use local data if available.

IV. Fire-burned and habitat treatment areas will not be included in the project scale degradation disturbance calculation for managing sage-grouse habitat under a disturbance cap. These areas will be considered part of a sagebrush availability when rangewide, consistent, interagency fine- and site-scale monitoring has been completed and the areas have been determined to meet sage-grouse habitat requirements. These and other disturbances identified in Table 3 will be part of a sagebrush availability evaluation and will be considered along with other local conditions that may affect sage-grouse during the analysis of the proposed project area.

V. Planning units are directed to use a density cap related to the density of energy and mining facilities (listed below) during project scale authorizations. If the disturbance density in a proposed project area is on average less than 1/ 640 acres, proceed to the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1/ 640 acres, either defer the proposed project or co-locate it into existing disturbed area *(subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.).*

   - Energy (oil and gas wells and development facilities)
   - Energy (coal mines)
   - Energy (wind towers)
   - Energy (solar fields)
   - Energy (geothermal)
   - Mining (active locatable, leasable, and saleable developments)

VI. Planning units are directed to continue using the baseline data from the 2013 USGS Baseline Environmental Report (BER) in the Affected Environment section of the proposed plans/ FEISs. West-wide sagebrush availability and habitat degradation data layers will be used for the Priority Habitat Management Areas in each population for monitoring (see the GRSG Monitoring Framework in the Monitoring Appendix of the EIS) and management purposes as the LUPs are being implemented. The BER reported on individual threats across the range of sage-grouse while the west-wide disturbance calculation consolidated the anthropogenic disturbance data into a single measure using formulas from the GRSG Monitoring Framework. These calculations will be completed on an annual basis by the BLM's National Operation Center. Planning units will be provided the 2014 baseline disturbance calculation derived from the west-wide data once the RODs are signed that describe the Priority Habitat Management Areas.

VII. Planning units are directed to use the three measures (sagebrush availability, habitat degradation, density of energy and mining) in conjunction with other information during the NEPA process to most effectively site project locations, such as by clustering disturbances and/or locating facilities in already disturbed areas. Although locatable mine sites are included in the degradation calculation, mining activities under the 1872 mining law may not be subject to the 3% disturbance cap. Details about locatable mining activities should be fully disclosed and analyzed in the NEPA process to assess impacts to sage-grouse and their habitat as well as to BLM goals and objectives, and other BLM programs and activities.

Additional Information/Formulas

Disturbance Calculations for the BSUs and for the Project Analysis Areas:

- For the BSUs: **% Degradation Disturbance = (combined acres of the 12 degradation threats*) ÷ (acres of all lands within the PHMAs in a BSU) x 100.**
- For the Project Analysis Area: **% Degradation Disturbance = (combined acres of the 12 degradation threats[1] plus the 7 site scale threats[2]) ÷ (acres of all lands within the project analysis area in the PHMA) x 100.**

[1] see Table 3. [2] see Table 2

Project analysis area method for permitting surface disturbance activities:

- Determine potentially affected occupied leks by placing a four mile boundary around the proposed area of physical disturbance related to the project. All occupied leks located within the four mile project boundary and within PHMA will be considered affected by the project.

- Next, place a four mile boundary around each of the affected occupied leks.
- The PHMA within the four mile lek boundary and the four mile project boundary creates the project analysis area for each individual project. If there are no occupied leks within the four-mile project boundary, the project analysis area will be that portion of the four-mile project boundary within the Priority Habitat Management Area.
- Map disturbances or use locally available data. Use of NAIP imagery is recommended.
- Calculate percent existing disturbance using the formula above. If existing disturbance is less than 3%, proceed to next step. If existing disturbance is greater than 3%, defer the project.
- Add proposed project disturbance footprint area and recalculate the percent disturbance. If disturbance is less than 3%, proceed to next step. If disturbance is greater than 3%, defer project.
- Calculate the disturbance density of energy and mining facilities (listed above). If the disturbance density is less than 1 facility per 640 acres, averaged across project analysis area, proceed to the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density is greater than 1 facility per 640 acres, averaged across the project analysis area, either defer the proposed project or co-locate it into existing disturbed area.
- If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, fully disclose the local and regional impacts of the proposed action in the associated NEPA.

Table 1. Anthropogenic disturbance types for disturbance calculations. Data sources are described for the west-wide habitat degradation estimates (Table copied from the GRSG Monitoring Framework)

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/ Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac (3.0ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2ft (73.2m)	USGS
Infrastructure (railroads)	Active Lines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (power lines)	1-199kV Lines	Platts (transmission lines)	100ft (30.5m)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150ft (45.7m)	BLM WO-300
	400-699kV Lines	Platts (transmission lines)	200ft (61.0m)	BLM WO-300
	700+kV Lines	Platts (transmission lines)	250ft (76.2m)	BLM WO-300
Infrastructure (communication)	Towers	Federal Communications Commission	2.5ac (1.0ha)	BLM WO-300

Table 2. The seven additional features to include in the disturbance calculation at the project scale

1. Coalbed Methane Ponds
2. Meteorological Towers
3. Nuclear Energy Facilities
4. Airport Facilities and Infrastructure
5. Military Range Facilities & Infrastructure
6. Hydroelectric Plants
7. Recreation Areas Facilities and Infrastructure

Table 3. Relationship between the 18 threats and the three habitat disturbance measures for monitoring and disturbance calculations.

USFWS Listing Decision Threat	**Sagebrush Availability**	**Habitat Degradation**	**Energy and Mining Density**
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and saleable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights-of-way		X	

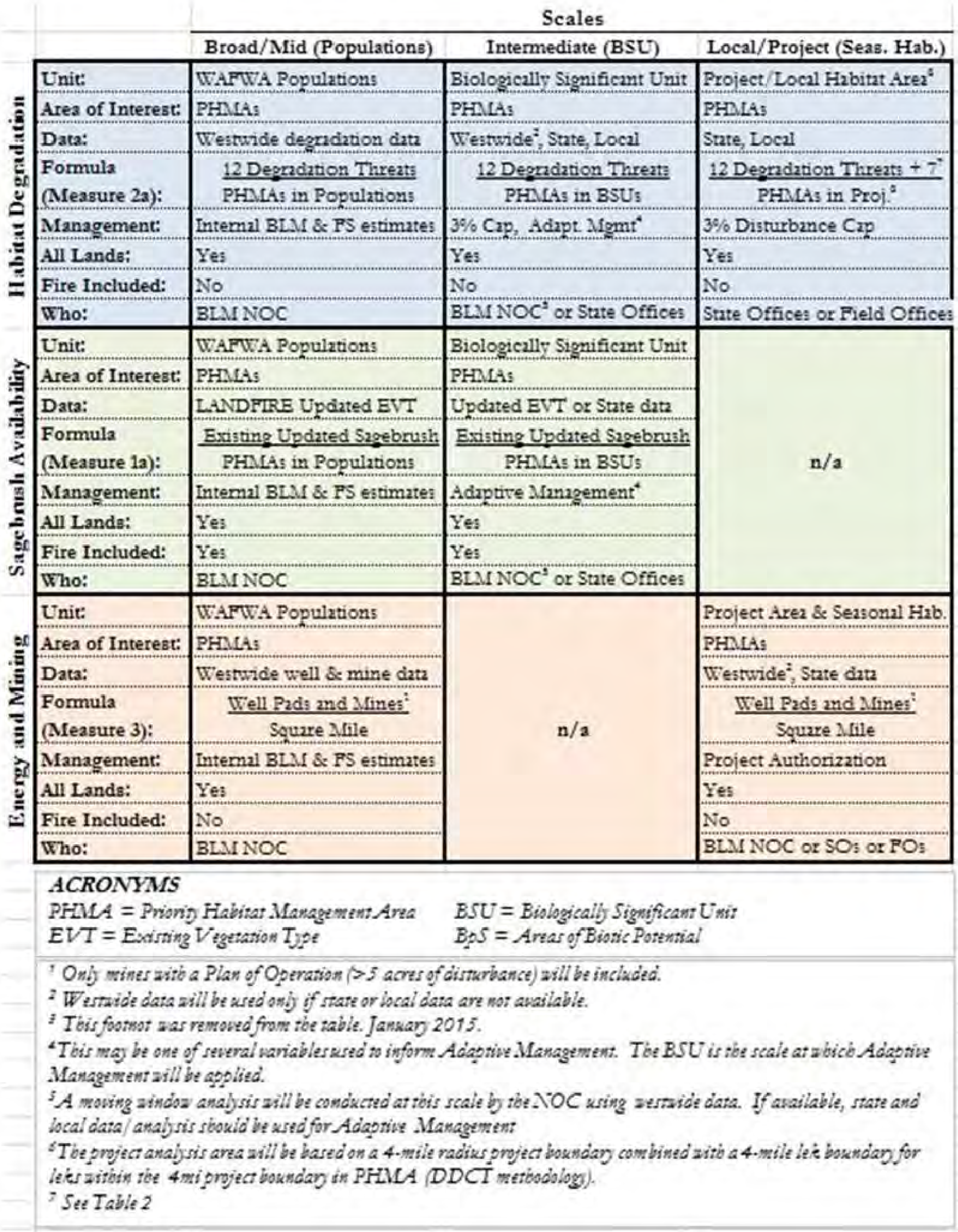
Attachments

Background

In the USFWS's 2010 listing decision for sage-grouse, the USFWS identified 18 threats contributing to the destruction, modification, or curtailment of the sage-grouse's habitat or range (75 FR 13910 2010). In April 2014, the Interagency GRSG Disturbance and Monitoring Sub-Team finalized the Greater Sage-Grouse Monitoring Framework (hereafter, framework) to track these threats. The 18 threats have been aggregated into three measures to account for whether the threat predominantly removes sagebrush or degrades habitat. The three measures are:

Measure 1: Sagebrush Availability (percent of sagebrush per unit area)
Measure 2: Habitat Degradation (percent of human activity per unit area)
Measure 3: Density of Energy and Mining (facilities and locations per unit area)

The BLM is committed to monitoring the three disturbance measures and reporting them to the FWS on an annual basis. However, for the purposes of calculating the amount of disturbance to provide information for management decisions and inform the success of the sage-grouse planning effort, the data depicting the location and extent of the 12 anthropogenic types of threats will be used at a minimum in the BSUs and those same 12 anthropogenic and the additional 7 types of features that are threats to sage-grouse will be used in the project analysis areas.



		Scales		
		Broad/Mid (Populations)	**Intermediate (BSU)**	**Local/Project (Seas. Hab.)**
Habitat Degradation	**Unit:**	WAFWA Populations	Biologically Significant Unit	Project/Local Habitat Area[6]
	Area of Interest:	PHMAs	PHMAs	PHMAs
	Data:	Westwide degradation data	Westwide[2], State, Local	State, Local
	Formula (Measure 2a):	$\frac{\text{12 Degradation Threats}}{\text{PHMAs in Populations}}$	$\frac{\text{12 Degradation Threats}}{\text{PHMAs in BSUs}}$	$\frac{\text{12 Degradation Threats + 7}^{7}}{\text{PHMAs in Proj.}^{5}}$
	Management:	Internal BLM & FS estimates	3% Cap, Adapt. Mgmt[4]	3% Disturbance Cap
	All Lands:	Yes	Yes	Yes
	Fire Included:	No	No	No
	Who:	BLM NOC	BLM NOC[3] or State Offices	State Offices or Field Offices
Sagebrush Availability	**Unit:**	WAFWA Populations	Biologically Significant Unit	**n/a**
	Area of Interest:	PHMAs	PHMAs	
	Data:	LANDFIRE Updated EVT	Updated EVT or State data	
	Formula (Measure 1a):	$\frac{\text{Existing Updated Sagebrush}}{\text{PHMAs in Populations}}$	$\frac{\text{Existing Updated Sagebrush}}{\text{PHMAs in BSUs}}$	
	Management:	Internal BLM & FS estimates	Adaptive Management[4]	
	All Lands:	Yes	Yes	
	Fire Included:	Yes	Yes	
	Who:	BLM NOC	BLM NOC[3] or State Offices	
Energy and Mining	**Unit:**	WAFWA Populations	**n/a**	Project Area & Seasonal Hab.
	Area of Interest:	PHMAs		PHMAs
	Data:	Westwide well & mine data		Westwide[2], State data
	Formula (Measure 3):	$\frac{\text{Well Pads and Mines}^{1}}{\text{Square Mile}}$		$\frac{\text{Well Pads and Mines}^{1}}{\text{Square Mile}}$
	Management:	Internal BLM & FS estimates		Project Authorization
	All Lands:	Yes		Yes
	Fire Included:	No		No
	Who:	BLM NOC		BLM NOC or SOs or FOs

ACRONYMS

PHMA = Priority Habitat Management Area	*BSU = Biologically Significant Unit*
EVT = Existing Vegetation Type	*BpS = Areas of Biotic Potential*

[1] *Only mines with a Plan of Operation (>5 acres of disturbance) will be included.*

[2] *Westwide data will be used only if state or local data are not available.*

[3] *This footnot was removed from the table. January 2015.*

[4] *This may be one of several variables used to inform Adaptive Management. The BSU is the scale at which Adaptive Management will be applied.*

[5] *A moving window analysis will be conducted at this scale by the NOC using westwide data. If available, state and local data/analysis should be used for Adaptive Management*

[6] *The project analysis area will be based on a 4-mile radius project boundary combined with a 4-mile lek boundary for leks within the 4mi project boundary in PHMA (DDCT methodology).*

[7] *See Table 2*

Attachment III

Greater Sage-Grouse (GRSG) Land Use Plans Vegetation Objectives Guidance

Purpose

I. Provide the planning units with land use planning vegetation objectives that need to be incorporated into the administrative draft proposed plans.

II. Provide guidance on the use of a template for GRSG habitat objectives in the Special Status Species section of the ADPPs.

III. Provide guidance on prioritizing land health assessments in sage-grouse habitats and conducting assessments at the watershed scale using the sage-grouse habitat objectives.

Guidance

I. Planning units will include the following land use plan vegetation objective within the Vegetation section of their administrative draft proposed land use plans (ADPPs) that states:

> *In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).*

II. Planning units will populate the GRSG Habitat Objectives table template to provide vegetation objectives for sage-grouse life history stages based on the ecology in your region to be used to meet the applicable land health standard in GRSG habitats. Planning units are encouraged to work across boundaries when developing the objectives to ensure regional continuity and will provide appropriate peer-reviewed science to support the habitat values for the indicators. These desired condition value can be a range of values rather than a single value (e.g., the value for the desired condition for sagebrush canopy cover in breeding and nesting habitat could be 15-25%). Planning units may include additional indicators and desired condition values as appropriate (see the Sage-Grouse Habitat Assessment Framework (HAF, *Technical Reference 6710-1*) for appropriate indicators). The HAF contains values for habitat suitability indicators in sage-grouse seasonal habitats from the Connelly et al. (2000) sage-grouse guidelines and has incorporated many of the core indicators in the AIM strategy (Toevs et al. 2011) as well. Planning units may use the indicator values from Connelly et al. (2000) while developing the land use plan Sage-Grouse Habitat Objectives table.

When using the indicators to guide management actions or during land health assessments, consider that the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale. Indicators must be collectively reviewed, assessed based on the site potential, and put into spatial and temporal context to correctly determine habitat suitability which will include more than one scale and multiple indicators. Assessment and evaluation of these objectives will follow the steps described in the HAF.

The GRSG Habitat Objectives table is to be placed in the Special Status Species section of the ADPP and is to be used as a minimum to meet the applicable land health standard in sage-grouse habitats.

Greater Sage-Grouse Habitat Objectives

ATTRIBUTE	INDICATORS	DESIRED CONDITION	Reference
BREEDING AND NESTING (Seasonal Use Period March 1-June 15)			
Lek Security	Proximity of trees		
	Proximity of sagebrush to leks		
Cover	% of seasonal habitat meeting desired conditions		
	Sagebrush canopy cover		
	Sagebrush height Arid sites Mesic sites		
	Predominant sagebrush shape		
	Perennial grass cover Arid sites Mesic sites		
	Perennial grass and forb height		
	Perennial forb canopy cover Arid sites Mesic sites		
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)			
Cover	% of Seasonal habitat meeting desired condition		
	Sagebrush canopy cover		
	Sagebrush height		
	Perennial grass canopy cover and forbs		
	Riparian areas/mesic meadows		
	Upland and riparian perennial forb availability		
WINTER[1] (Seasonal Use Period November 1-February 28)			
Cover and Food	% of seasonal habitat meeting desired conditions		
	Sagebrush canopy cover above snow		
	Sagebrush height above snow		

III. The BLM will prioritize land health assessments in Sagebrush Focal Areas (SFAs) followed by PHMAs outside of the SFAs. Field offices are to conduct land health assessments at the watershed scale and use the GRSG habitat objectives when assessing the applicable standard in GRSG habitats.

When conducting land heath assessments, the BLM should follow, at a minimum, "Interpreting Indicators of Rangeland Health" (Pellant et. al. 2005) and the "BLM Core Terrestrial Indicators and Methods" (MacKinnon et al. 2011). For assessments being conducted in GRSG designated management areas, the BLM should collect additional data to inform the HAF indicators that have not been collected using the above methods. Implementation of the principles outlined in the AIM strategy will allow the data to be used to generate unbiased estimates of condition across the area of interest; facilitate consistent data collection and rollup analysis among management units; help provide consistent data to inform the classification and interpretation of imagery; and provide condition and trend of the indicators describing sagebrush characteristics important to sage-grouse habitat.

Attachment IV

Incorporating GSGR RMP Decisions into Grazing Authorizations

Purpose

The purpose is to provide recommended ADPP language; outline the process for prioritizing the review and processing of grazing permits/leases to determine if modification is necessary (prior to renewal and in accordance with prioritization criteria); provide direction for including specific management thresholds and defined responses that will allow adjustments to livestock grazing within the terms and conditions of permits; and provide a process for prioritizing compliance monitoring within Sagebrush Focal Areas (SFAs) and Priority Habitat Management Areas (PHMAs).

Background

The BLM manages approximately 18,000 livestock grazing permits and leases on the public lands. Livestock grazing is an integral part of the BLM multiple-use mission and is authorized by the Taylor Grazing Act (1934), the Federal Land Policy Management Act (1976) and the Public Rangeland Improvement Act (1978). By statute and regulation, grazing leases and permits are normally issued for 10-year periods. Annually, a range of 1,200 to 3,200 grazing permits expire and the BLM receives 500 to 1,500 grazing permit/lease transfer requests.

The BLM currently issues permits/leases in accordance with:

- All applicable law, regulation, policy (NEPA, consultation, proposed/final grazing decision-also known as a fully processed permit); or
- Various appropriation authorities enacted between 1999 and 2014 extending terms and conditions of expiring or transferred permits/leases that the BLM is unable to fully process before their expiration; or
- Section 402(c)(2) of FLPMA (as amended by Public Law 113-291, enacted December 19, 2014).

Congress has acted to ensure that grazing permittees could continue to graze if the BLM is unable to complete the environmental analysis mandated by the NEPA and other applicable laws. Since 1999, a provision ("the rider") has been included in the Interior Appropriations bill that, in various forms, generally authorizes the BLM to renew grazing permits and leases under their same terms and conditions until it fully processes the permit renewal in compliance with NEPA, ESA, and other legal or regulatory requirements. The most recent rider is contained in Section 411, Public Law 113-76.[1] The FLPMA amendment to Section 402 (c) allows BLM to renew

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[1] The Consolidated Appropriations Act, 2014 includes the provision Section 411 which states: "Section 415 of division E of Public Law 112–74 is amended by striking ''and 2013'' and inserting ''through 2015.'' The terms and conditions of section 325 of Public Law 108-108 (117 stat. 1307), regarding permits at the Department of the Interior and the Forest Service, shall remain in effect through fiscal year 2015. A grazing permit or lease issued by the Secretary of the Interior for lands administered by the Bureau of Land Management that is the subject of a request for a grazing preference transfer shall be issued, without further processing, for the remaining time period in

grazing permits and leases under the same terms and conditions. This relieves the BLM's renewal processing workload, allowing the BLM to prioritize permit processing based on sensitivity of the resources at issue.[2]

The BLM may modify terms and conditions of a permit or lease at any time following completion of appropriate analysis and consultation, cooperation, and coordination with the affected lessees or permittees, the State having lands or responsible for managing resources within the area, and the interested public.[3] Under 43 C.F.R. 4160.1, the BLM must serve a proposed decision on any affected applicant, permittee or lessee, any agent and lien holder of record. Copies of the decisions are provided to the interested publics.

Recommended Language to be incorporated as Livestock Grazing Management Actions within the GRSG ADPPs:

- The BLM will prioritize the review of grazing permits/leases, including those prior to renewal to determine if modification is necessary, and processing of grazing permits and leases, in Sagebrush Focal Areas (SFAs) followed by PHMAs outside of the SFAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource conditions (ex., fire) and legal obligations.
- The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFAs and PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table and/or Land Health Standards (43 CFR 4180.2) and defined responses that will allow the authorizing officer to make adjustments to livestock grazing without conducting additional NEPA.
- Allotments within SFAs, followed by those within PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to

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the existing permit or lease using the same mandatory terms and conditions. If the authorized officer determines a change in the mandatory terms and conditions is required, the new permit must be processed as directed in section 325 of Public Law 108-108." Where a FO is unable to fully process a permit renewal in compliance with all applicable laws prior to the permit expiration, Section 411 extends the authority to renew the grazing permit with the same terms and conditions as the expiring permit. Section 325 provides the process for authorizing grazing until a permit or lease is issued in compliance with all applicable law and regulatory processes.

[2] The newly amended section 402(c) of FLPMA provides permanent authority to BLM to renew expiring permits. That section states, "The terms and conditions in a grazing permit or lease that has expired, or was terminated due to a grazing preference transfer, shall be continued under a new permit or lease until the date on which the Secretary concerned completes any environmental analysis and documentation for the permit or lease required under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and other applicable laws."

[3] 43 CFR 4130.3-3 states: Following consultation, cooperation and coordination with the affected lessees or permittees, the State having lands or responsible for managing resources within the area, and the interested public, the authorized officer may modify terms and conditions of the permit or lease when the active grazing use or related management practices are not meeting the land use plan, allotment management plan or other activity plan, or management objectives, or is not in conformance with the provisions of subpart 4180 (Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration).

help ensure compliance with the terms and conditions within the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.

- At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives.

Addressing GRSG RMP Amendments/Revisions Objectives in Grazing Permits/Leases

BLM will develop criteria to prioritize the workload to process permits/leases (either fully processed or reauthorized based on the Appropriations rider, or issued under Section 402(c)(2) of FLPMA) and determine whether modification is necessary prior to renewal within PHMAs, beginning with those in SFAs. In setting priorities, those containing riparian areas and areas not meeting Land Health Standards (43 C.F.R. 4180) will take precedence. Potential criteria for prioritizing permit modifications could include:

- Are there riparian areas or wet meadows in the permit/lease area?
- Was current livestock grazing identified as a causal factor for not meeting Land Health Standards?
- Since the last allotment/watershed evaluation, is there current monitoring information to determine that the watershed/allotment is currently achieving or making significant progress towards achieving land health standards?
- Does the permit have terms and conditions adequate to ensure proper grazing practices to meet GRSG habitat objectives found in the Special Status Species section of the land use plan?
- Is there data that indicates that the GRSG habitat objectives, including the Habitat Objectives table, found in the Special Status Species section of the land use plan are being met?
- Is there a request from the permittee to modify the terms and conditions of his/her permit?

Additionally, if an existing permit/lease within PHMAs requires modification because current grazing is a significant causal factor for not meeting the Land Health Standards, the BLM will prepare the appropriate NEPA analysis and issue the proposed/final grazing decision under 43 C.F.R. Subpart 4160, subject to administrative appeal and potential judicial challenge.

The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFAs and PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table and/or Land Health Standards (43 CFR 4180.2) and defined responses that will allow the authorizing officer to make adjustments to livestock grazing without conducting additional NEPA. Adjustments to meet seasonal Sage-Grouse habitat requirements could include:

- Season or timing of use;
- Numbers of livestock (includes temporary non-use or livestock removal);
- Distribution of livestock use;
- Intensity of use; and
- Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats).

Compliance Monitoring

The BLM will monitor grazing permits/leases renewed or modified in accordance with the direction contained in this guidance as follows: Allotments within SFAs, followed by those in other PHMA, and focusing on those with riparian areas, will be prioritized for monitoring to ensure compliance with the terms and conditions in the permits. The BLM will collect, at a minimum, the following monitoring data:

- Vegetation Condition
- Actual Use
- Utilization
- Use Supervision

Concerning Voluntary Relinquishments

All ADPPs will include the following language:

At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives.

For completing this, BLM offices should use WO IM 2013-184 Relinquishment of Grazing Permitted Use or the most recent policy guidance.

Attachment V

Applying Lek Buffer-Distances When Approving Actions

- *Buffer Distances and Evaluation of Impacts to Leks*
  Evaluate impacts to leks from actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer-distances as identified in the USGS Report *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Open File Report 2014-1239). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer-distances is as follows:
    - linear features (roads) within 3.1 miles of leks
    - infrastructure related to energy development within 3.1 miles of leks.
    - tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.
    - low structures (e.g., fences, rangeland structures) within1.2 miles of leks.
    - surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.
    - noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.

  Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization.

  In determining lek locations, the BLM will use the most recent active or occupied lek data available from the state wildlife agency.

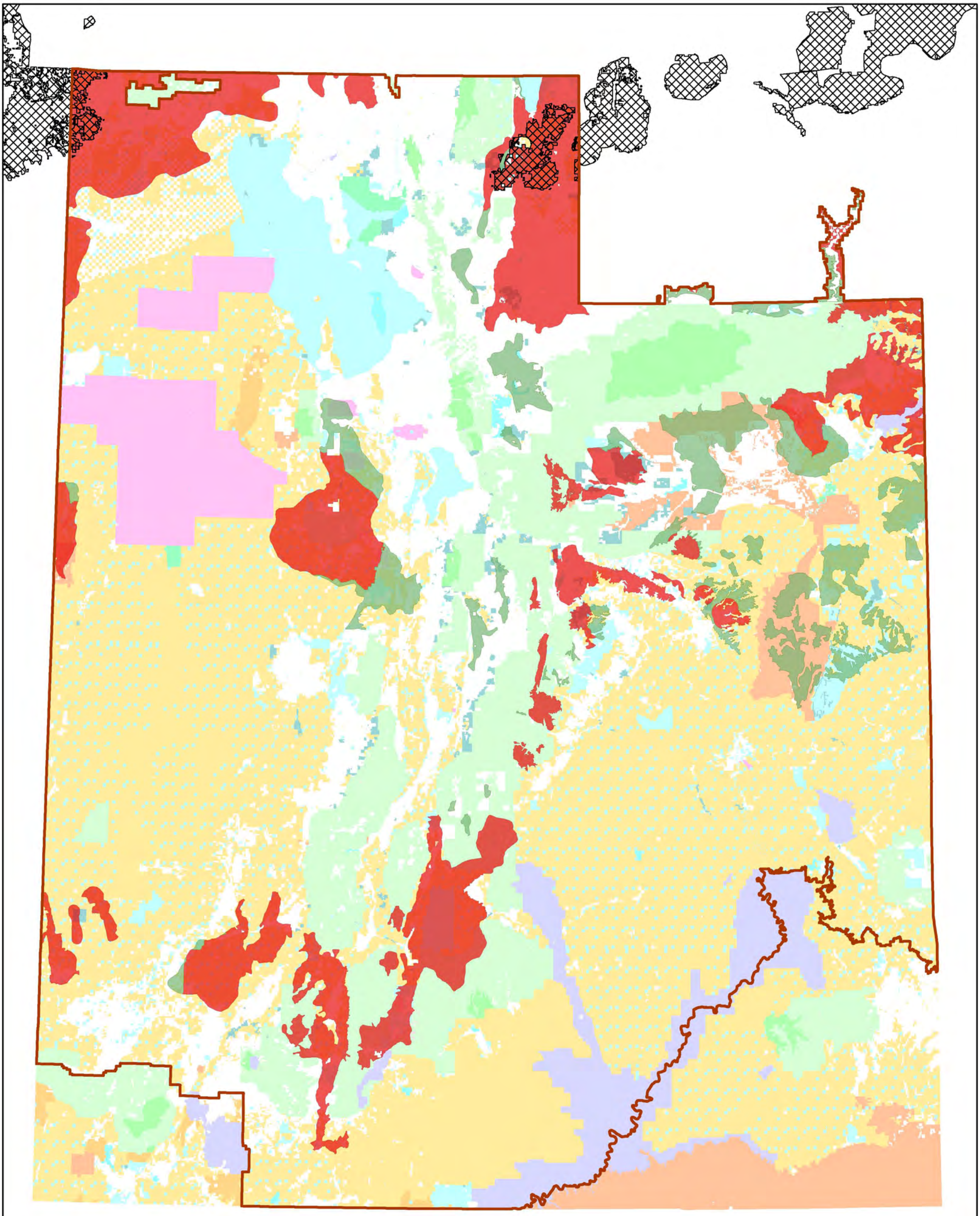
- *For Actions in GHMA*
  The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis.
    - Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.
    - If it is not possible to relocate the project outside of the applicable lek buffer-distance(s) identified above, the BLM may approve the project only if:
        - Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM determines that a lek buffer-distance other than the applicable distance identified above offers the same or a greater

    level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or
    - The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations); and
    - Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain, as outlined in the Mitigation Strategy (Appendix X).

- *For Actions in PHMA*
  The BLM will apply the lek buffer-distances identified above as mandatory conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.

  The BLM may approve actions in PHMA that are within the applicable lek buffer distance identified above only if:
    - The BLM, with input from the state fish and wildlife agency, determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than the distance identified above offers the same or greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.

- The BLM will explain its justification for determining the approved buffer distances meet these conditions in its project decision.



Legend

PlanBdyName

☐ Utah Sub-regional Planning Area

▨ Sage Focal Areas_Draft

SG_PPMA_AltF Working copy February 9th

Habitat_ID

🟩 UT general; WY general

🟥 UT priority; WY priority

From: Sidon, Joshua [jsidon@blm.gov]
Sent: Wednesday, June 11, 2014 7:36 AM
To: Uriarte, Alex
Subject: Torell et al (2014)

It's no longer "forthcoming"...see below.

Josh

---------- Forwarded message ----------
From: **Julie Suhr Pierce** <jsuhrpierce@blm.gov>
Date: Mon, Jun 9, 2014 at 6:48 AM
Subject: Fwd: Sage-grouse
To: Robert Winthrop <RWinthro@blm.gov>, Joshua Sidon <jsidon@blm.gov>, Rebecca Moore <rmoore@blm.gov>

All,

This arrived on Friday. I have not had time yet to take a look but will do so today.

Julie

Sent from my iPhone

Begin forwarded message:

> **From:** "Rimbey, Neil (nrimbey@uidaho.edu)" <nrimbey@uidaho.edu>
> **Date:** June 7, 2014 at 6:23:17 PM MDT
> **To:** Gretchen Hyde <ghyde@idahorange.org>, Jeffery Foss <jfoss@blm.gov>, "Launchbaugh, Karen (klaunchb@uidaho.edu)" <klaunchb@uidaho.edu>
> **Cc:** "Roheim, Cathy (croheim@uidaho.edu)" <croheim@uidaho.edu>, "Julie Suhr Pierce" <jsuhrpierce@blm.gov>, Allen Torell <atorell@ad.nmsu.edu>, "John A. Tanaka" <jtanaka@uwyo.edu>, Gene Gray <geneusmc@srvinet.com>, "Jensen, K. Scott (scottj@uidaho.edu)" <scottj@uidaho.edu>, "Chad Gibson (ccgibson@citlink.net)" <ccgibson@citlink.net>, Brichardsbs <brichardsbs@aol.com>
> **Subject: FW: Sage-grouse**
>
> FYI. Publication is available via the link below. It deals with the Ranch-level Economic Impacts of alternative sage-grouse strategies and covers ranch models that we developed for Idaho, Oregon, Nevada and Wyoming. Let us know if you have questions. Neil

From: John A. Tanaka [mailto:jtanaka@uwyo.edu]
Sent: Friday, June 06, 2014 3:50 PM
To: Rimbey, Neil (nrimbey@uidaho.edu); Torell, Allen; John P. Ritten; David T. Taylor; Thomas K. Foulke
Subject: Sage-grouse

The publication is live. http://www.wyomingextension.org/publications/Search_Details.asp?pubid=1858

John Tanaka
Sent from my Windows Phone

--
Josh Sidon, Ph.D.
Economist, National Operations Center
Bureau of Land Management
Denver Federal Center, Bldg. 50
P.O. 25047
Denver, CO 80225
Phone: 303-236-6343
Fax: 303-236-3508

From: Mermejo, Lauren <lmermejo@blm.gov>
Sent: Monday, August 10, 2015 11:53 AM
To: nvca sagegrouse
Subject: Fwd: FW: New: "Fire and Fuels Management Contributions to Sage-grouse" report from the WAFWA Working Group
Attachments: WAFWA_Fire Report Finalv1.01.22.15.pdf

---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Thu, Jan 29, 2015 at 5:09 PM
Subject: FW: New: "Fire and Fuels Management Contributions to Sage-grouse" report from the WAFWA Working Group
To: Quincy Bahr <qfbahr@blm.gov>, Brent Ralston <bralston@blm.gov>, jmbeck@blm.gov, Joan Suther <jsuther@blm.gov>, Jessica Rubado <jarubado@blm.gov>, Randall Sharp <sharphay@att.net>

From: Morales, Raul [mailto:rmorales@blm.gov]
Sent: Thursday, January 29, 2015 11:58 AM
To: NV 930 staff
Subject: Fwd: New: "Fire and Fuels Management Contributions to Sage-grouse" report from the WAFWA Working Group

FYI

Raul Morales

Nevada BLM Deputy State Director

Resources Land and Planning

775-861-6464 (o)

775-861-6712 (f)

---------- Forwarded message ----------
From: **Todd Hopkins** <todd_hopkins@fws.gov>
Date: Thu, Jan 29, 2015 at 11:41 AM
Subject: New: "Fire and Fuels Management Contributions to Sage-grouse" report from the WAFWA Working Group
To: Carol Schuler <cschuler@usgs.gov>, Joe Freeland <jfreeland@blm.gov>, Kathryn Stangl <kstangl@blm.gov>, Stephen Small <ssmall@blm.gov>, Cyndi Sidles <cyndi_sidles@fws.gov>, Jason Pyron <jason_pyron@fws.gov>, Jeff Everett <jeff_everett@fws.gov>, Jesse DElia <jesse_delia@fws.gov>, Kenneth E Mayer <ken.e.mayer@gmail.com>, Kevin Doherty <kevin_doherty@fws.gov>, Lou Ballard <lou_ballard@fws.gov>, "Maestas, Jeremy - NRCS, Redmond, OR" <Jeremy.Maestas@or.usda.gov>, Michael Carrier <michael_carrier@fws.gov>, Mike Gregg <mike_gregg@fws.gov>, Sarah Kulpa <sarah_kulpa@fws.gov>, Ted Koch <ted_koch@fws.gov>, Theresa Rabot <theresa_rabot@fws.gov>, Todd Hopkins <todd_hopkins@fws.gov>, Dawn Davis <dawn_davis@fws.gov>, Sean Finn <sean_finn@fws.gov>, Richard Nelson <richard_d_nelson@fws.gov>, Yvette Converse <yvette_converse@fws.gov>, Kevin Johnson <kevin_m_johnson@fws.gov>, John Rice <JRice@usbr.gov>, Pat Deibert <pat_deibert@fws.gov>, Sandy Gregory <s50grego@blm.gov>, Rick Kearney <rkearney@blm.gov>, Karen Blakney <kblakney@blm.gov>, Karen Prentice <kprentic@blm.gov>, Louisa Evers <levers@blm.gov>, Randy Sharp <sharphay@att.net>, Tony Wasley <twasley@ndow.org>, Jimi Gragg <jimigragg@utah.gov>, Carmen Bailey <carmenbailey@utah.gov>, Genie MontBlanc <emb@cabnr.unr.edu>, Jennifer Newmark <jnewmark@heritage.nv.gov>, Raul Morales <rmorales@blm.gov>, Sue Phillips <sue_phillips@usgs.gov>, Bob Unnasch <bunnasch@tnc.org>, Louis Provencher <lprovencher@tnc.org>, Tim Brown <Tim.Brown@dri.edu>, Tamara Wall <twall@dri.edu>, Adam Watts <Adam.Watts@dri.edu>
Cc: Ken Berg <ken_berg@fws.gov>, Stephen Zylstra <stephen_zylstra@fws.gov>, Stephen Torbit <stephen_torbit@fws.gov>

Pass this along please

From: Kenneth E Mayer [mailto:ken.e.mayer@gmail.com]
Sent: Wednesday, January 28, 2015 4:44 PM
To: Tom Christiansen; Shawn P. Espinosa; Don Kemner; Todd Hopkins; Mike Pellant; Jeremy Maestas; Jeanne Chambers; David Pyke; Jason Vernon; Michael Ielmini; Laurie Kurth; lara Niell; Steve Lewis; Brian Mealor; Dawn M Davis; Chad Boyd
Cc: Doug Havlina; Ted Koch
Subject: Fire and Fuels Management Report

Attached, please find our final report "Fire and Fuels Management Contributions to Sage-grouse". The report has been distributed to the leadership of DOI and DOA. Noreen Walsh told me this afternoon that the report and recommendations will be used as a key part of the implementation of the recent Secretarial Order. Please distribute the report as you appropriate. We will not make many hard copies. Rather it will be available to be downloaded from the WAFWA and USFWS GRSG websites.

Cheers!

Ken Mayer, *CWB* ©
K. E. Mayer, LLC
P.O. Box 9891
Reno, NV 89507
(775) 741-9942

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Lauren L. Mermejo
Great Basin Greater Sage-Grouse Project Mgr.
BLM, Nevada State Office
775 861-6580

WESTERN ASSOCIATION OF FISH AND WILDLIFE AGENCIES

WILDFIRE AND INVASIVE WEED INITIATIVE

Fire and Fuels Management Contributions to Sage-Grouse Conservation

A Status Report

WAFWA Wildfire and Invasive Species Initiative Working Group.

Doug W. Havlina, P. Anderson, L. Kurth, K.E. Mayer, J.C. Chambers, C. Boyd, T. Christiansen, D. Davis, S. Espinosa, M. Ielmini, D. Kemner, J.D. Maestas, B. Mealor, M. Pellant, J. Tague, and J. Vernon. 2014.

USFWS Conservation Objectives Team Report (2013) Objective:

“The long-term conservation goal for sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities is to maintain viable, connected, and well-distributed populations and habitat across their range, through threat amelioration, conservation of key habitats, and restoration activities.”

U.S. Fish and Wildlife Service. 2013. Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013

Table of Contents

Suggested Citation:

Havlina, Doug W., P. Anderson, L. Kurth, K.E. Mayer, J.C. Chambers, C. Boyd, T. Christiansen, D. Davis, S. Espinosa, M. Ielmini, D. Kemner, J.D. Maestas, B. Mealor, M. Pellant, J. Tague, and J. Vernon. 2015. Fire and Fuels Management Contributions to Sage-Grouse Conservation: A Status Report. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming. 73 pp.

Executive Overview

Within big sagebrush (*Artemisia tridentata*) communities, expansion of invasive plants and changes in wildfire patterns have emerged as the greatest threat to sage-grouse habitats, particularly in the western part of its range. Feedback cycles between invasive species and large intense wildfires effectively fragment habitats, reduce sagebrush cover, and create fire-prone landscape conditions detrimental to sage-grouse. In response to this threat, numerous efforts to respond to wildland fires and manage vegetation are underway, with an overarching intent of conserving sage-grouse and their habitats. This report, developed by the Western Association of Fish and Wildlife Agencies (WAFWA), Wildfire and Invasive Species Initiative Working Group (Working Group), summarizes the current state of Fire Operations and Fuels management functions. While other status reports have been completed, there has been no synthesis of the fire and fuels management programs at the private, local, state, and federal agency scales. The intent of this report is to illustrate the type and responsiveness of efforts being made. Finally, the report concludes by presenting future options and a series of recommendations that may inform future policy and allocation decisions.

Drivers of Report

This report is driven by the need among wildlife management and regulatory agencies for an explanation of the decision-making and allocation processes in wildland fire management, including hazardous fuels management programs. Specifically, the WAFWA Working Group was requested by the U.S. Fish and Wildlife Service (USFWS) to evaluate and explain how sage-grouse and their habitats are included in fire management prioritization, real-time resource allocations, and project development.

Organization of Report

This report is divided into seven sections. The introduction provides the background of the issue and scope of the document. The second and third sections describe the current state of the Federal and State programs, respectively. The fourth section describes efforts taking place at local scales, often involving partnerships between local agencies and private landowners. The fifth section concludes with practices that hold promise, opportunities, barriers, and additional considerations that may be useful in future policy and infrastructure decisions. The sixth section presents recommendations related to policy, funding, and science and technology. The final section contains appendices.

Acknowledgements

Many people and organizations have contributed to the development of this report. We would like to acknowledge the USFWS, BLM, USFS, NRCS, for their financial support and providing the staff time for their employees to serve on the WAFWA Working Group. We also want to thank the Great Basin state fish and wildlife agencies (NDOW, ODFW, IDFG, WYGF, UDWR) for supporting their biologist to serve on the Working Group. Special thanks must be given to Steve Lewis with University of Nevada Reno, Cooperative Extension and Lara Neil with NDOW for their support of the Work Group efforts. And finally we want to extend a special thank you to Dr. David Pyke (USGS) and Theodore Stein (USFWS) for their editorial support and San Stiver (WAFWA) for assistance in developing the final publication.

I Introduction

Wildland fire management, as it pertains to sage-grouse conservation, is a collaborative effort that involves agencies and participants at all levels of government. Because fire knows no political boundaries, its management in the United States is a coordinated effort among federal, state, tribal and local agencies through the National Interagency Fire Center (NIFC), National Interagency Coordination Center (NICC), and the National Wildfire Coordinating Group (NWCG). While land management and fire management objectives vary among agencies and across governmental levels, there are consistent standards, coordination, and agreements that enable all agencies to work together to provide the most effective and efficient response to wildfire regardless of location and land ownership. Federal agencies play a lead role in the coordination of these practices, while state and local agencies are key cooperators and play a coordinated role across the range of sage-grouse. For this document, wildland fire management is referred to as **fire management**, and meant to include preparedness activities, fire operations, and all related logistical coordination. **Fuels management** is defined as those practices intended to modify fire behavior, improve ecological condition, or augment fire suppression efforts. Examples of fuels management practices include prescribed burning, mechanical, chemical, and biological treatments. The explanation of federal, state, and local fire/fuels management programs will be necessarily broad to convey the many interconnected components. Federal programs are specific to the Bureau of Land Management (BLM), U.S. Forest Service (USFS), USFWS, Bureau of Indian Affairs (BIA), and National Park Service (NPS). While emergency stabilization and rehabilitation (ESR) and burned area emergency rehabilitation (BAER) are key elements of habitat restoration, they are not covered in this report.

Recent Wildfire Trends and Occurrence

As identified in the 2013 COT report, large fires in sagebrush habitats pose a daunting challenge to land managers. In the past 15 years, the interplay of annual invasive plants, multiple fire ignitions, and climatic extremes have resulted in large-scale habitat losses. Arranged in descending order based on acreage, the largest fires in sage-grouse habitat in the past decade are illustrated below and further described in Murphy et al. (2013). Fire seasons in the west vary greatly year to year, strongly influenced by trends in weather patterns. Large fires typically occur during strong winds (often associated with cold front passage) coinciding with high, flashy fuel loading, multiple fire starts from lightning, and where topography or remoteness slows initial attack (source: John Glenn, BLM Fire Operations Division Chief). Between 1992 and 2012, 33,782 fires occurred in sage-grouse habitat (defined as priority and general habitats). During this time, 97% (32,601) of fires were less than 1,000 acres and 242 (less than 1%) were greater than 10,000 acres. Within the last decade (2005 through 2014), 8,028 fires burned on priority and general habitats.

Of these, 5,760 were lightning caused (72%), and 2,268 were human caused (28%). Fires caused by power lines, vehicles, and equipment use (welding, cutting torches, chainsaws, etc.) were the most common human ignition sources, followed by railroad fires, warming/cooking fires, agricultural/debris burning, and fireworks.

Fire Name	Acres	Fire Year	State
Murphy Complex	590,808	2007	Idaho
Long Draw	582,707	2012	Oregon
Holloway	461,088	2012	Nevada, Oregon
Buzzard Complex	395,349	2014	Oregon
Milford Flat	356,664	2007	Utah
Rush	315,510	2012	California
Long Butte	306,171	2010	Idaho
Southeastern Montana Complex	248,744	2012	Montana
Winters	238,649	2006	Nevada
Winecup Complex	234,413	2007	Nevada
Crysta	220,052	2006	Idaho
Kinyon Road	210,939	2012	Idaho
Derby	208,771	2006	Montana

Table 1 Largest wildfires in or adjacent to greater sage-grouse habitats, 2006-2014 (source: USGS fire perimeter database).

Fire seasons in the west vary greatly year to year, strongly influenced by trends in weather patterns. Large fires typically occur during strong winds (often associated with cold front passage) coinciding with high, flashy fuel loading, multiple fire starts from lightning, and where topography or remoteness slows initial attack (source: John Glenn, BLM Fire Operations Division Chief). Between 1992 and 2012, 33,782 fires occurred in sage-grouse habitat (defined as priority and general habitats). During this time, 97% (32,601) of fires were less than 1,000 acres and 242 (less than 1%) were greater than 10,000 acres. Within the last decade (2005 through 2014), 8,028 fires burned on priority and general habitats. Of these, 5,760 were lightning caused (72%), and 2,268 were human caused (28%). Fires caused by power lines, vehicles, and equipment use (welding, cutting torches, chainsaws, etc.) were the most common human ignition sources, followed by railroad fires, warming/cooking fires, agricultural/debris burning, and fireworks.

The table below illustrates the distribution of fire size classes in sage-grouse habitat (1992-2012).

Fire Occurrence in Sage-Grouse Habitat (all causes)							
Fire Size (Acres)	< 1 acre	< 10 acres	< 100 acres	< 1K acres	<10 K acres	>10 K acres	All Fires
# of fires	17,838	26,580	30,399	32,601	33,540	242	33,782
% of all fires	53%	79%	90%	97%	99%	.7%	100%

Table 2 Fire occurrence in greater sage-grouse habitats, 2006-2014 (source: USGS GeoMac fire perimeter database).

*Sage-Grouse habitat data source: Data submitted by states with sage-grouse habitat and compiled by National Interagency Fire Center.

*Fire occurrence data source: Short, Karen C. 2014. Spatial wildfire occurrence data for the United States, 1992-2012 FPA_FOD_20140428]. 2nd Edition. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. http://dx.doi.org/10.2737/RDS-2013-0009.2

Today's Situation: What does this fire trend mean?

Several conclusions can be drawn from the raw data. First, effective initial attack keeps over 99% of wildfires at less than 10,000 acres. Given the extreme burning conditions which fire managers face, this is a commendable achievement. At the same time, any management actions done before the fire which can eliminate even one "mega-fire" is a valuable investment. While there is little room to further improve the initial attack effectiveness, certain pro-active measures may compliment suppression efforts and potentially result in fewer large fires.

II. Federal Fire and Fuels Management Programs

Federal land management agencies are responsible for all aspects of fire on federal lands as well as for leading the coordination of response to all wildfires in the country that require resources beyond local and regional capabilities, regardless of land ownership. Additionally, the federal government can draw upon or support international fire management resources. To support the goal of managing fire at the lowest jurisdictional level, yet ensure adequate resources are available, fire management is organized in a tiered structure from the local unit to the Geographic Area Coordination Centers (GACC), to the National Interagency Coordination Center (NICC). Federal agencies assess fire potential in relation to values at risk, such as homes, communities, and natural resources, to determine how to initially position assets across the country to reduce risk and to be prepared for response. As conditions change, these assets can be repositioned to where fire potential is greatest.

Wildfire management has leveraged science and technology to develop a broad suite of fire behavior, fire risk, and fire potential models. These tools are applied by fire managers to inform actions before, during and after wildfire. All federal agencies have land management plans describing management objectives or desired conditions for a defined area. Fire and fuels program goals tier off of land management objectives. Before the fire season, climatology data is updated, seasonal outlooks are generated, and pre-season training is completed, which includes fire management considerations in sage-grouse habitat (see best management practices, Appendix B). Once a wildfire starts on a unit, the response reflects pre-identified values such as GRSG habitats, infrastructure, or wildland-urban interface. If a unit is unable to meet their objectives with their assets, they can request assistance from other units, agencies, or through the Geographic Area Coordination Center. If sufficient assets are unavailable, they are requested through the National Interagency Coordination Center. In the few instances when fire management needs outstrip resources nationally, resources are allocated based on the values at risk and probability of success. In summary, sage-grouse habitat is but one of myriad values considered in these decisions.

The National Cohesive Wildland Fire Management Strategy (Cohesive Strategy)

This initiative, finalized in 2014, lays the broad framework for fire and fuels management in the years ahead. The Strategy establishes key goals and regional action plans which are specific to the area of interest. All greater sage-grouse habitat falls within the "western" region identified in the strategy. Key cohesive strategy goals include:

- **Restore and maintain landscapes**: Landscapes across all jurisdictions will be managed for resilience to fire-related disturbances in accordance with management objectives. Corresponding resource functions include fuels management, forestry, restoration/ rehabilitation, and other vegetation management programs.
- **Fire-adapted communities**: Human populations and infrastructure are prepared to withstand a wildfire without loss of life and property. (Communities here are defined as human population locations rather than vegetative communities). Corresponding resource functions include preparedness, mitigation, education, and fire prevention.
- **Wildfire response**: All jurisdictions actively participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

Further information on the Cohesive Strategy is available at: www.forestsandrangelands.gov.

Land Use and Fire Management Plans

Fire management response among Federal agencies is pre-planned, coordinated, and guided by Land Use Plans (LUPs), Fire Management Plans (FMPs), and local operational plans. Land Use Plans provide overarching goals and objectives for federal agencies. This guidance may include subdividing a jurisdiction into smaller landscapes, such as management areas, management prescription categories, or other polygons. Unique fire and fuels management guidance within these polygons is further refined in agency Fire Management Plans. The *2009 Guidance for Implementation of Federal Wildland Fire Management Policy* directs all federal units with burnable vegetation to develop Fire Management Plans that refine broad land use plan guidance into specific management actions for the Fire Operations and Fuels Management functions. FMPs identify areas having unique management guidance related to habitat protection, equipment use, appropriate suppression tactics, planned fuels accomplishments, and desired conditions. An example of guidance might include protection measures for highly valued habitats, heavy equipment constraints, guidance for burning out during fire operations, mitigation efforts to protect leks, or other measures specific to that area. Increasingly, agencies are moving to spatial fire management plans that rely on geospatial data and fewer text documents to convey fire and fuels management guidance. FMP guidance is further refined into operational plans at the local unit level. Information from FMPs is translated to specific, operational guidance to fire suppression resources, dispatch centers, and related support staff. Examples of local operational guidance would include dispatch procedures during multiple-start days, staffing of outstations, local best management practices, lek locations, and duty officer assignments.

Process for Fire Operations Coordination and Prioritization

At all times, firefighter and public safety is the overriding tenet for fire operations. Beyond that absolute, the decision framework driving fire operations is highly complex, and driven by values at risk, budget, availability of firefighting resources, and numerous political factors. This complexity is amplified when firefighting resources are scarce, values are threatened, and significant risk to human life or property is involved. The entities described in this section each play a role in real-time decision-making related to the deployment and management of wildfires. Where applicable, the relevance of these entities related to sage-grouse is noted at the end of each section in a text box.

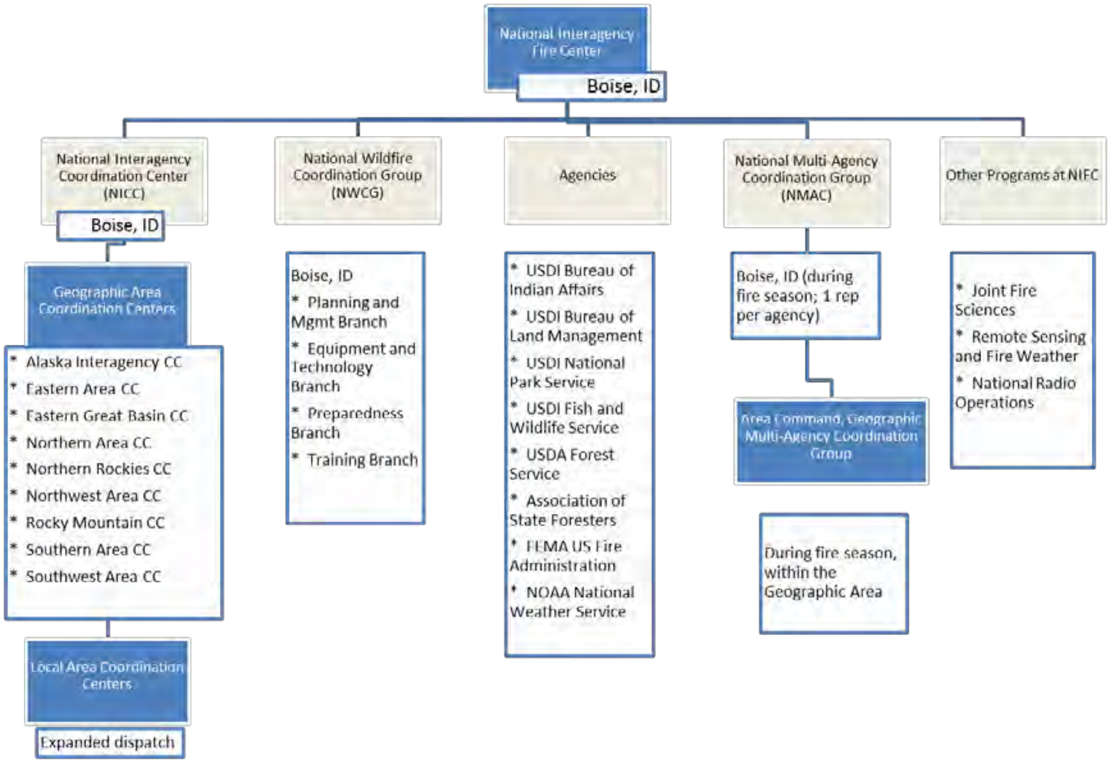


Figure 1 Structure of the National Interagency Fires Center, Boise, Idaho and related fire operations groups.

National Interagency Fire Center

The National Interagency Fire Center, located in Boise, Idaho, serves as the centralized location for coordination of wildland fire management across the United States (see http://www.nifc.gov/).

Eight different agencies are represented at NIFC. All facets of fire management such as budget, policy, operations, fuels, training, decision support, resource allocation, supply, logistics, and communication are represented at the fire center.

How does NIFC affect sage-grouse?

As the focal point for coordinating the national mobilization of resource for incidents throughout the United States, NIFC plays a key role in ensuring resources are moved to locations of highest need based on values at risk (e.g., life/property, infrastructure, communities, natural resources). Additionally, the center maintains equipment and supplies that can be easily dispatched to support fire management. Since all agencies are represented at the center, it promotes coordination of fire policy development, implementation, and fire planning.

National Wildfire Coordinating Group

The purpose of the National Wildfire Coordinating Group (NWCG) is to provide national leadership to develop, maintain, and communicate interagency standards, guidelines, qualifications, training, and other capabilities that enable interoperable operations among federal and non-federal entities (see www.nwcg.gov). Core membership includes representatives from the USFS, all DOI agencies, Federal Emergency Management Agency, U.S. Fire Administration, and non-federal entities such as the Intertribal Timber Council and the National Association of State Foresters. The NWCG involves a series of committees including Fire Planning, Fuels Management, Equipment Technology, Training, and Risk Management. Collectively, these committees provide overarching guidance for Fire and Fuels Management. The functions of NWCG are to:

- Develop and propose standards, guidelines, training, and certification for interagency wildland fire operations.
- Establish qualifications for all wildfire positions, including required training, experience, and competencies in order to perform wildfire support tasks.
- Maintain approved standards, guidelines, training, and certification for interagency wildland fire operations.
- Participate in the development of operational standards and procedures for non-fire incident and emergency management to ensure consistency and interoperability.

How does NWCG affect sage-grouse?

The overarching charge of NWCG is to facilitate efficient fire management through training, logistical, budgetary, and standards development. Consistent standards for operations, training, and qualifications of fire personnel enable movement of resources across the country and across agencies. Use of sage-grouse examples in training curricula is one opportunity to expand awareness.

National Interagency Coordination Center

The NICC, located at NIFC, is the focal point for overseeing all interagency coordination activities throughout the United States. Wildfire suppression is built on a three-tiered system of support - the local area, one of the 11 geographic areas, and finally, the national level. When a fire is reported, the local agency and its firefighting partners respond. If the fire continues to grow, the agency can ask for help from its geographic area. When a geographic area has exhausted all its resources, it can turn to NICC at the National NIFC for help in locating what is needed, from air tankers to radios to firefighting crews to incident management teams. Additional information on NICC can be found at: http://www.nifc.gov/nicc/index.htm.

Figure 2 Map of Geographic Area Coordinating Centers.

How does NICC affect sage-grouse?

NICC serves as a logistical coordination center and facilitates the efficient ordering and dispatch of all fire management resources across geographic areas. NICC does not make allocation decisions.

Geographic Area Coordination Centers

GACCs coordinate resource ordering and showcase fire activity in their area. GACCs participate in meetings and calls used to establish national drawdown and preparedness levels. It should be noted that the Eastern Great Basin and Western Great Basin Coordination Centers will be combined in 2015, and located in Salt Lake City, Utah.

Western Great Basin Geographic Area Coordination Center (WGBCC) is the interagency focal point for coordinating the mobilization of resources for wildland fire, wildland fire use, prescribed fire and other all-hazard incidents throughout the Western Great Basin Area and, when necessary, for assignment throughout the United States. Located in Reno, Nevada the Center also provides Intelligence and Predictive Services related-products to support wildland fire managers and firefighters in the decision making process throughout the Great Basin

PREPAREDNESS LEVELS

WGB	1	(8/4/14)
Nationa	1	(9/29/14)

GREAT BASIN IMT ROTATION

IMT 1:	Lund: 10/8 - 10/14
IMT 2:	DeMasters/Rosenthal: 10/3 - 10/9
IMT 3:	Mizer: 10/3 - 10/9

National Team Rotations

Other News and Information

GB IMT Evaluation (pdf)

GB IMT Evaluation (word)

Tweets

WGBCC News and Notes @WGBCC 29 Sep
Effective immediately the national planning level will move from PL2 to PL1.
Expand

WGBCC News and Notes @WGBCC 25 Sep
RED FLAG WARNING: In effect today (Thursday) for the central Sierra into western NV for gusty winds/low RH. weather.gov/fire
Expand

WGBCC News and Notes 24 Sep

Figure 3. Each geographic area coordination center hosts a website showcasing resource availability and fire activity in their region.

How do Geographic Area Coordination Centers affect sage-grouse?

The primary charge of GACCs is to implement resource assignment decisions made by the Geographic Multi-Agency Coordination group. GACCs which implement GMAC decisions in sage-grouse habitats include Eastern Great Basin (http://gacc.nifc.gov/egbc/index.php), Western Great Basin (http://gacc.nifc.gov/wgbc/), Northwest (http://www.nwccweb.us/index.aspx), and Rocky Mountain (http://gacc.nifc.gov/rmcc/).

National Multi-Agency Coordination Group

The National Multi-Agency Coordination Group (NMAC), located at NIFC, is comprised of representatives from the BLM, BIA, NPS, USFS, USFWS, Federal Emergency Management Administration (FEMA), and the National Association of State Foresters. The NMAC group prioritizes and allocates resources when there are critical shortages of national resources such as smokejumpers, air tankers, or Type 1 Incident Management Teams IMTs). The NMAC provides an essential management mechanism for national level strategic coordination to ensure that firefighting resources are efficiently and appropriately managed in a cost effective manner. The NMAC is responsible for establishing National and Geographic Area MAC business practices; ensuring timely national level incident information and firefighting resource status; setting national priorities among Geographic Areas; directing, allocating and reallocating firefighting resources among Geographic Areas to meet NMAC priorities; anticipating and identifying future firefighting resource requirements; and coordinating and resolving firefighting resource policy issues. The NMAC delegation specifically provides the authority to manage resource prioritization and allocation between Geographic Areas. Management of resources within a Geographic Area is the responsibility of the GMAC. Further information on NMAC can be found at: http://www.nifc.gov/nicc/administrative/nmac/index.html.

Roles and responsibilities of NMAC include:

- Establishing national priorities among the Geographic Areas (GAs)
- Directing and allocating resources among or between GAs to meet national priorities
- Providing oversight of general business practices between NMAC and the Geographic Multi-Agency Coordination (GMAC) groups
- Distributing and archiving NMAC:
    - Decisions
    - Direction
    - Best management practices
- Determining National Preparedness Levels (PLs)
- Determining national fire resource availability to support non-fire/all hazard operations (Reference Support to the National Response Framework)
- Managing Area Command Teams

How does the National Multi-Agency Coordination Group affect sage-grouse?

NMAC affects sage-grouse as a result of allocation decisions made across geographic areas. NMAC establishes the priority order among GACCs, and where scarce resources are placed across the country. NMAC decisions are necessarily broad, and consequently do not address species-specific topics.

Note: Further information on the Objectives, Policy, and Scope for wildland fire operations and supporting groups can be found in the National Interagency Mobilization Guide (http://www.nifc.gov/nicc/mobguide).

Area Command, Geographic Multi-Agency Coordination (GMAC) Groups

Area Command teams manage multiple fire incidents in a geographic area, under delegation from local Agency Administrators. They are comprised of an area commander, and leadership for planning, logistics, and aviation. At a slightly larger scale, each geographic area is represented by a GMAC group, which establishes priorities for resource allocation for all fires within the geographic area. Membership of GMAC groups includes fire management designees, who report to Agency Administrators for affected jurisdictions. GMAC groups review Incident

Status Summaries (ICS form 209) and identified values at risk to assign incident management teams, set priorities, and make key allocation decisions. These priorities include the type and number of resources which manage fires. For example, GMACs direct the placement of scarce resources such as Hotshot Crews and overhead.

How do Area Command Teams and Geographic Multi-Agency Groups affect sage-grouse?

Area Command teams and GMAC groups make key decisions related to the staffing and prioritization of fires at multiple scales within geographic areas. Their decisions have direct consequences for sage-grouse habitats. Membership of these groups is largely represented by fire operations employees who may not be informed on sage-grouse habitats, populations, and threats. Based upon identified values at risk fire complexity, and information from local dispatch centers, priorities for staffing and support are established. Consequently, decisions made by Area Command Teams and GMAC groups have a strong and direct influence on sage-grouse habitats.

Predictive Services

Predictive Service staff units are located at the NICC and at the GACCs across the country. These units were developed to provide decision support prior to expected fire activity and help determine resource allocation needs. Predictive Services provides information and products for three functional areas; fire weather, fire danger/fuels, and intelligence/resource status. It functions under the guidance of the National Predictive Services Subcommittee (NPSS), which is chartered under NWCG to provide leadership and direction for the program. Predictive Services products include:

(1) 7-Day Fire Potential Outlooks are designed to determine when and where regionally and nationally shared resources will be in demand across the U.S. for the subsequent week. This daily report assesses large fire potential and provides a weather synopsis for a seven-day period. It combines forecasted fuel dryness with significant weather triggers to identify high-risk areas. A national map is under development to display fire potential across the country for each day of the forecast period.

(2) Monthly Outlooks and Seasonal Trend Forecasts are normally posted on the first workday of each month and produced with input from all of the Geographic Area Predictive Service units using the most recent weather and fuels data available. These outlooks include general reports with maps intended to provide fire management personnel with an area-wide outlook and prediction of where the greatest fire potential will exist during the following month. They also provide a trend forecast for the following three-month period.

How does Predictive Services affect sage-grouse?

Predictive Services indirectly influence sage-grouse by defining patterns of fire occurrence, large fire potential, and fire weather. This information is used at geographic and local scales to position resources and other pre-suppression activities.

Local Dispatch Centers

Fire Operations resources are coordinated at the unit level by local dispatch centers. Although the assignment of fire resources may appear random, pre-planned dispatch procedures reflect direction from Land Use Plans and Fire Management Plans. Dispatch centers convey daily fire weather forecasts, provide daily resource tracking, and assign resources to fire incidents. The assignment of fire operations resources such as engines, dozers, and water tenders is largely pre-planned. These pre-planned decisions are delivered through automated computer dispatching systems, such as Wildfire Computer Aided Dispatch (WildCAD) that provide specific directions for responding to individual rural properties, including a description of the property, water sources available, and any special information pertinent to fire suppression and rescue operations In these applications, the type and number of resources dispatched to an incident is pre-identified based upon fire danger rating factors, potential for growth, number of on-going fires, and guidance contained in fire management plans. Finally, local duty officers (typically Fire Management Officers) further refine the prioritization of resources during multiple fire situations or as conditions warrant.

How do local dispatch centers affect sage-grouse?

Local dispatch centers are the conduit for mission-critical information between fire suppression resources and fire managers. Dispatch centers implement staffing assignments according to pre-established factors. Local dispatch centers affect sage-grouse by making decisions that allocate suppression resources based on changing fire conditions.

Predictive Services indirectly influence sage-grouse by defining patterns of fire occurrence, large fire potential, and fire weather. This information is used at geographic and local scales to position resources and other pre-suppression activities.

Duty Officer

During the fire season, most federal agencies are required to designate a duty officer who is the responsible official for tactical coordination of multiple wildfires within a unit. Duty Officers are typically qualified as a Type III incident commander and serve as the connection to local line officers during fires. Duty Officers ensure an adequate span of control for operational resources, and apply broad oversight to local fire management programs. Duty Officers are commonly drawn from a pool of Fire Management Officers, Assistant Fire Management Officers, Fire Operations Specialists, Fuels Management Specialists, or other managers meeting minimum IQCS qualifications.

How do duty officers affect sage-grouse?

Duty officers influence sage-grouse as a result of staffing decisions that consider safety, values at risk, and myriad operational details. Their decisions are informed by a number of competing factors in a dynamic environment. For example, duty officers must make real-time decisions which balance considerations such as habitat loss, probability of success, and multiple fires, typically with incomplete information.

Incident Commander

All wildfires are managed by an on-site Incident Commander (IC), regardless of fire size or complexity. IC's are responsible for: ensuring safety; proper transfer of command as fire complexity changes; developing objectives, strategies, and tactics; building the organizational structure as conditions change; assigning resources; and completing documentation. Incident commanders and their subordinates interact with resource advisors for protection or conservation of natural and cultural features. In sage-grouse habitats, these considerations could relate to lek locations, seasonal habitats, and other information relevant to fire management decisions. Incident commanders or their subordinates make real-time decisions related to fire line location, heavy equipment use, or burning out.

How do incident commanders affect sage-grouse?

Incident commanders affect sage-grouse by making tactical decisions in real time. These include fire line locations, direct or indirect attack methods, burnouts/blacklining, and others that affect the scale and location of firefighting impacts and effectiveness. This is the scale at which conservation of locally relevant sage-grouse habitats can occur. Thus, incident commanders are key in the chain of command.

Resource Advisors

Resource Advisors are responsible for anticipating fire impacts on natural and cultural resources, and for advising the Incident Commander. Resource advisors are typically federal agency employees, but may include qualified state-employees. It should be noted that there are opportunities for non-federal biologists to contribute to fire management by serving as resource advisors. Because of their expert knowledge of local conditions, resource advisors play a critical role in ensuring compliance with Land Use and Fire Management Plans related to location of fire lines, acceptable heavy equipment use, location and concerns related to critical wildlife habitat or populations archaeological sites, management in wilderness areas and other resource conflicts. Resource advisors are currently identified in BLM’s Best Management Practices as an important asset in mitigating certain negative effects of fire operations in and around sage-grouse habitats.

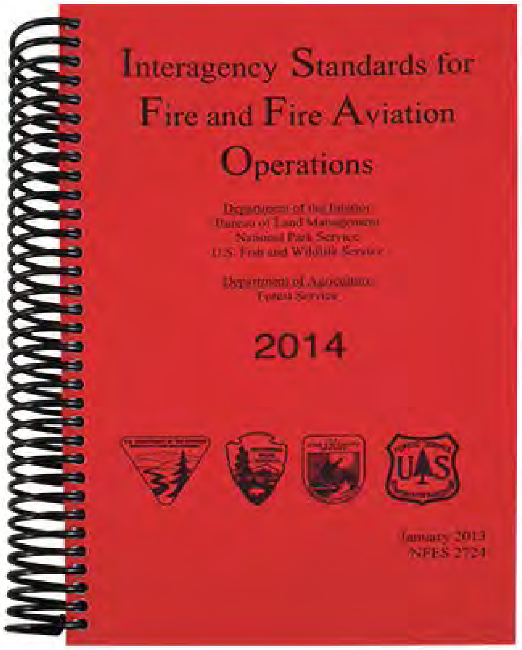
How do resource advisors affect sage-grouse?

Resource advisors provide biological expertise to inform tactical decisions, such as fire line locations, direct or indirect attack methods, or heavy equipment use. Resource advisors provide information but do not make tactical decisions. Resource advisors thus indirectly influence populations and habitats through this information exchange with on-the-ground fire managers.

Fire Operations Policy Guidance

Operational federal wildland fire policy is embedded in a document called the "*Interagency Standards for Fire and Fire Aviation Operations*" (also known as the Redbook, reflecting the color of its front and back covers). The Redbook provides fire and fire aviation program management direction for BLM, USFS, USFWS, and NPS managers. Employees engaged in fire management activities are required to comply with all agency-specific health and safety policies. Other resources, such as the NWCG Incident Response Pocket Guide (PMS 461, NFES 1077) and the NWCG Wildland Fire Incident Management Field Guide (PMS 210), provide operational guidance. BLM-specific guidance on sage-grouse conservation is provided in the Redbook in a section titled *"Sage-Grouse Conservation Related to Wildland Fire and Fuels Management."* Excerpts from Chapter 2 of the Redbook include:

- Utilize available maps and spatial data depicted sage-grouse habitats during suppression activities;
- Use predictive services to prioritize and preposition firefighting resources in critical habitat areas.



Interagency Standards for
Fire and Fire Aviation
Operations

Department of the Interior
Bureau of Land Management
National Park Service
U.S. Fish and Wildlife Service

Department of Agriculture
Forest Service

2014

January 2013
NFES 2724

Figure 4 The *Interagency Standards for Fire and Fire Aviation Operations* provides fire management guidance for federal agencies.

BLM's fire management best management practices for sage-grouse can be found at the BLM's Fire Operations website (see Appendix 2).

State	Preparedness and Fuels Positions	Engines	Hotshot Crews	Smokejumpers	Fixed Wing Aircraft*	Helicopters
CA	303	28	2	0	0	2
CO	174	16	1	0	2	1
ID	469	49	1	0	4	2
MT	208	18	0	0	3	2
NV	378	50	2	0	4	3
OR/WA	427	51	1	0	3	3
UT	275	31	1	0	3	2
WY	132	16	0	0	0	1
NIFC	50	0	0	80 (national resource)	8	0

Table 3 BLM suppression and fuels management capacity in 2014 (source: 2014 National Preparedness Program Summaries) (*Includes air attack, lead planes, and smokejumper aircraft. There are an additional 33 Single Engine Air Tankers (SEATs) (Interagency contracts) used heavily in sagebrush fires not accounted for in this column).

Forest Service fire personnel and equipment available nationally include:

Heavy equipment (e.g., dozers, water tenders)	Preparedness Positions*	Engines	Hotshot Crews	Air Tankers	Helicopters
210	8,340	900	67	18	123

Table 4. USFS suppression capacity in 2014

* includes seasonal workforce

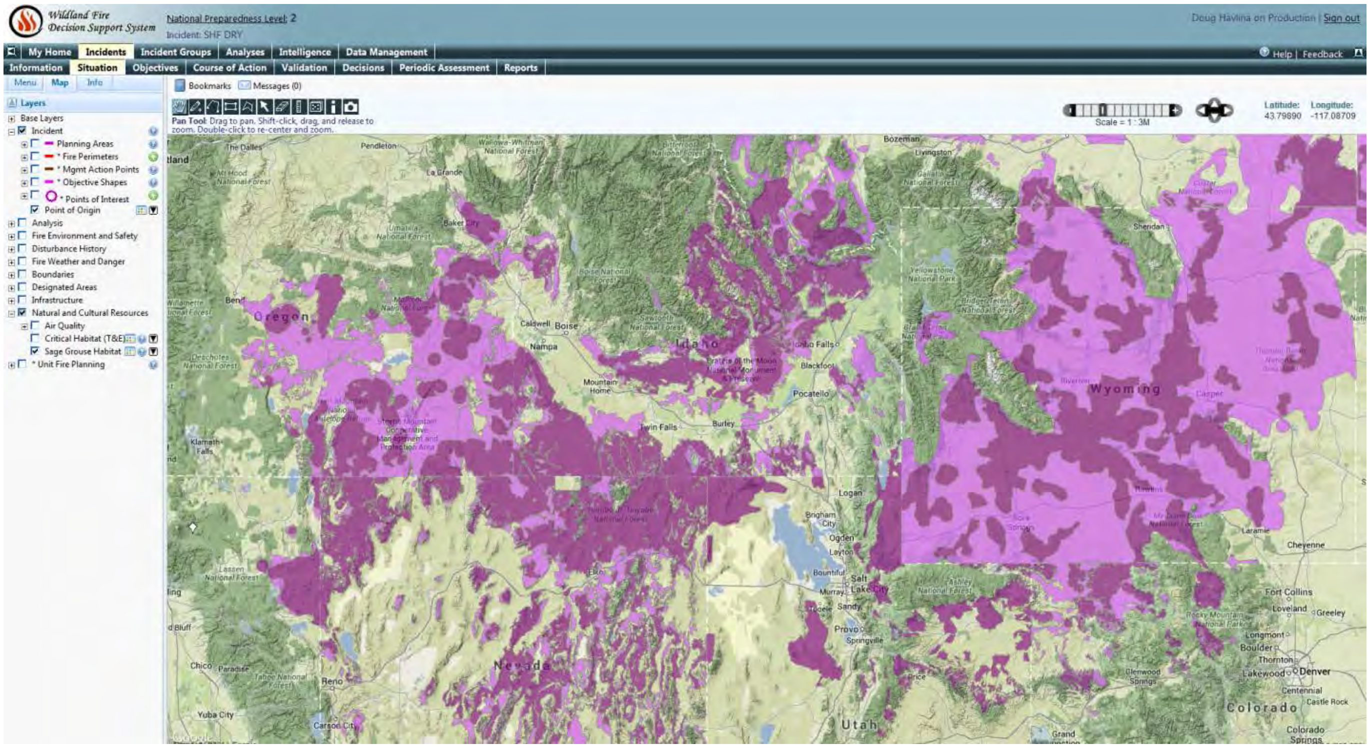
Fire Personnel and Equipment

Federal agencies maintain a diverse cadre of seasonal and full-time fire personnel and equipment dedicated to fire preparedness, fire response, and fuels management. Additionally, many personnel in resource, maintenance, administration, and emergency response positions are trained and actively participate in fire management, greatly increasing the overall response capacity. With personnel stationed in sage-grouse habitat as well as throughout the country, federal agencies have the capability to conduct long-term management of fuels management, fire preparedness and response as well as provide surge capacity as necessary.

Decision Support

The Wildland Fire Decision Support System (WFDSS) is a web-based application used by all federal agencies and select state agencies to evaluate wildfire risks and document decisions. Land use and fire management plan information, as well as geospatial layers, are pre-loaded in WFDSS for consideration when determining the response to a fire. This land and fire management plan information, as well as the geospatial display of values and key resources, predicted fire spread through fire behavior modeling and the risk and benefits assessment are utilized in the system to make risk informed decisions on fires.

WFDSS contains geospatial displays of preliminary priority habitat (PPH) and preliminary general habitat (PGH) for both greater and Gunnison sage-grouse which are annually updated as the information is revised at the State scale. These layers are used during wildfire situations to support management decisions related to resource placement, suppression strategies, and other considerations influenced by the presence of sage-grouse habitat. Opportunities exist to incorporate additional sage-grouse habitat features into WFDSS in the future if it provides value to decision makers.



Pan Tool: Drag to pan. Shift-click, drag, and release to zoom. Double-click to re-center and zoom.

Figure 4. Displays of PPH and PGH in the Wildland Fire Decision Support System

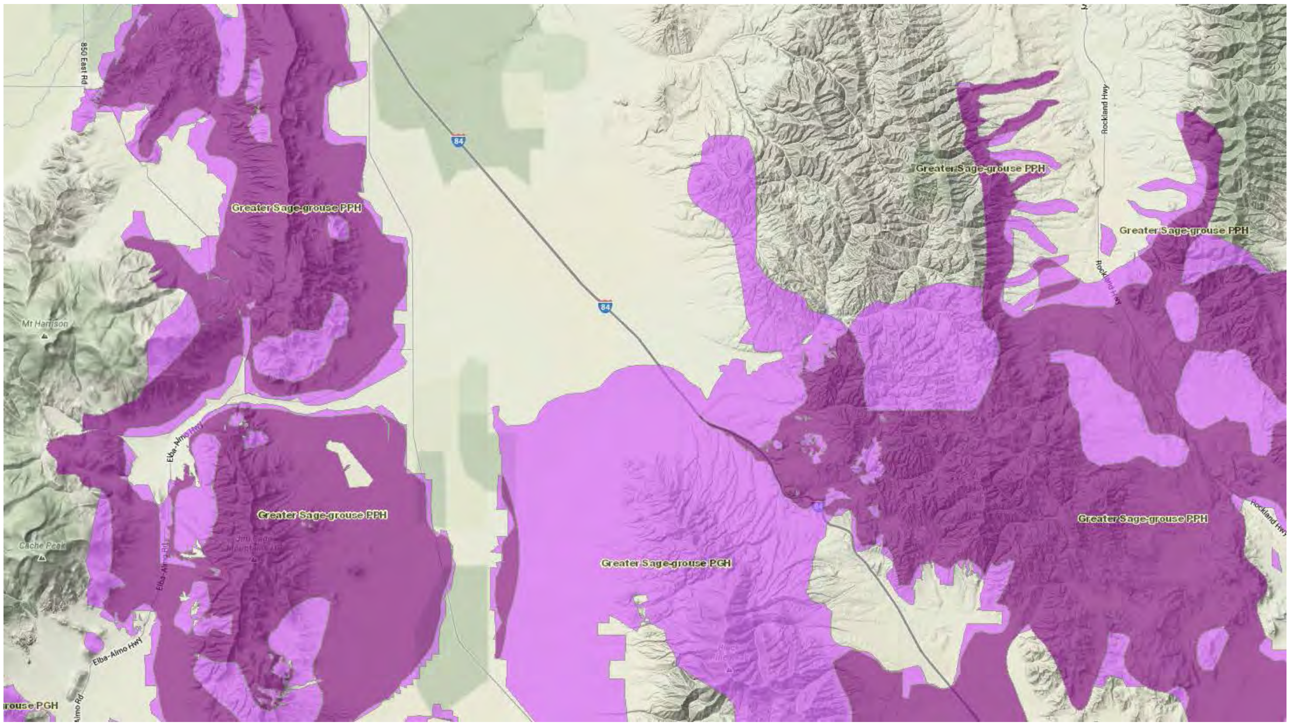


Figure 5. Displays of PPH and PGH in the Wildland Fire Decision Support System (Zoomed)

How does WFDSS affect sage-grouse?

WFDSS provides spatial displays of PPH and PGH across the range of sage-grouse. These data inform real-time fire decisions related to suppression strategies and prioritization. This display allows managers to see the spatial relationship between habitats and on-going fires. A summary of acres of at-risk habitat is included in the WFDSS values inventory page.

Federal Prevention and Fuels Management Accomplishments

The federal fuels management program is led by the NWCG Fuels Management Committee (FMC), which "… has primary responsibility for developing, implementing and providing oversight for an effective and coordinated National interagency wildland fuels management program. The program is designed to help mitigate risks from wildland fires to the wildland/urban interface and its infrastructure and to maintain and restore healthy vegetative communities in other wildland areas." Furthermore, the FMC "…provides national interagency program oversight to: reduce wildland fire risk to communities, restore and maintain land health, ensure that Hazardous Fuels Reduction program funding is targeted to the highest national fuels project priorities, ensure program accountability, effectiveness and efficiency, develop standards and policy for prescribed fire, promote efficient biomass use, promote economic opportunities for rural communities, emphasize landscape scale cross-boundary projects."

From 2002 to present, the FMC has directed $140 million to $210 million annually to federal agencies for fuels projects. This work includes management actions such as prescribed burning and mechanical treatments, as well as practical research such as The Sage-Steppe project and the Fire Effects Information System. For further information on the FMC, see http://www.nwcg.gov/branches/ppm/fmc/index.htm

Change in BLM Fuels Funding Allocation

As recently as FY 2012, the funding for BLM's fuels management programs was strongly skewed to treatments in the Wildland-Urban Interface (WUI). At that time, approximately 90% of BLM's fuels budget was allocated to projects which reduced risks to communities and infrastructure in and around urban areas. In three years, the emphasis of the fuels program has changed dramatically to emphasize treatments which benefit sage-grouse. Beginning in fiscal year 2015, BLM is allocating a significant proportion of project dollars ($25 million) to projects which benefit sage-grouse, following guidance in the Wildfire and Invasive Annual Grass Assessment (FIAT) Step 1. These funds are for projects which address threat factors and include conifer removal, seeding, chemical treatment of invasive species, strategically placed fuel breaks, and other measures which change fire behavior, augment suppression effectiveness, or maintain/restore habitat. BLM's fuels management funding is now skewed to States having the five priority FIAT landscapes which have been identified as most at risk due to fire and invasives. Specifically, BLM's fuels funding is earmarked for projects near or within the focal habitats identified in the FIAT process. Many projects resulting from FIAT assessments will be fuels treatments designed to improve initial attack effectiveness.

In a continued effort to reduce wildfire impacts to sage-grouse habitat, in 2014 BLM treated approximately 239,000 acres. Treatments were mainly focused on building and maintaining fuel breaks (14,000 acres) to conserve existing sage-grouse habitat, reducing conifer encroachment (112,000 acres), and treating invasive species (112,000 acres) to reduce wildfire hazard.

FY14 BLM Fuels Program Summary _Sage Grouse Conservation Work								
State	Invasive Species Work		Conifer Encroachment Work		Fuel Break Work		Total Acres in SG	
	Acres Treated	Cost	Acres Treated	Cost	Acres Treated	Cost	Acres Treated	Cost
CA	876	$0	6,054	$500,000	80	$61,000	7,010	$561,000
CO	1,892	$256,600	1,470	$1,052,300	28	$54,400	3,390	$1,363,300
ID	56,675	$3,416,350	16,403	$2,986,276	4,277	$265,000	77,355	$6,667,626
MT	6,624	$498,525	3,998	$825,975	0	$0	10,622	$1,324,500
NV	10,829	$755,867	8,034	$340,165	4,138	$232,225	23,001	$1,328,257
OR	11,045	$123,000	40,175	$2,997,377	759	$86,059	51,979	$3,206,436
UT	20,213	$419,500	34,107	$3,257,195	2,902	$357,268	57,222	$4,033,963
WY	4,808	$288,750	2,200	$430,000	1,441	$60,000	8,449	$778,750
BLM Total	112,962	$5,758,592	112,441	$12,389,288	13,625	$1,115,952	239,028	$19,263,832

Table 5 BLM fuels accomplishments, specific to sage-grouse habitat restoration, maintenance, or conservation, 2012-2014 (units = acres treated).

BLM Sage-Grouse Fuels Treatment Accomplishments, 2012-Present (units = acres)

	2012			2012 Total
	Fire	Mechanical	Other	
California	278	2,514	1,783	4,575
Colorado	612	1,044	3,447	5,104
Idaho	543	277,356	33,990	311,889
Montana	6,534	5,036	0	11,570
Nevada	2,535	18,072	378	20,985
Oregon	8,045	1,687	0	9,731
Utah	384	14,867	2,736	17,986
Wyoming	12,467	2,441	1,974	16,881
BLM Total	31,398	323,017	44,308	398,722

	2013			2013 Total
	Fire	Mechanical	Other	
California	268	3,333	0	3,601
Colorado	182	689	246	1,117
Idaho	3,011	22,753	19,549	45,314
Montana	689	1,251	0	1,940
Nevada	0	2,535	0	2,535
Oregon	0	1,815	0	1,815
Utah	14	11,841	3,019	14,874
Wyoming	1,639	1,006	4,306	6,950
BLM Total	5,803	45,222	27,119	78,145

	2014			2014 Total
	Fire	Mechanical	Other	
California	1,071	5,898	0	6,969
Colorado	779	876	0	1,655
Idaho	276	45,905	13,400	59,581
Montana	7,542	2,520	0	10,062
Nevada	731	10,127	7,035	17,893
Oregon	11,928	21,106	0	33,034
Utah	739	35,440	0	36,179
Wyoming	1,111	597	675	2,383
BLM Total	24,177	122,469	21,110	167,756

Table 5 continued

The National Fire Plan Operations Reporting System

The National Fire Plan Operations and Reporting System (NFPORS) is a Department of Interior automated data management and reporting system. NFPORS was established in 2001 to provide accountability for hazardous fuels reduction, burned area rehabilitation projects, and community assistance activities. The system has tabs used to track projects that benefit candidate, sensitive, and TES species. A latitude and longitude is entered for each planned project, and a shapefile is uploaded when projects are completed. Consequently, specific queries about federal projects that have been implemented for sage-grouse can be obtained from the system.

The effectiveness of federal fuels management projects is documented in local monitoring records and also the Fuels Treatment Effectiveness Monitoring (FTEM) database. Federal agencies are required to enter the following observations into this system whenever a wildfire intersects a federally implemented fuels treatment:

(1) "Did the treatment modify fire behavior?" (Y/N)

(2) "Did the treatment help control the wildfire?" (Y/N)

Based upon these and other qualitative observations, some conclusions may be drawn related to fuels treatment effectiveness which can be used to improve the treatment prescriptions.

Federal Prevention, Education, and Outreach Efforts

While treatments that augment suppression efforts or restore habitats are important, public awareness of fire prevention goals is also a component in habitat conservation. The BLM and its partners are working to prevent human-caused fires that burn sage-grouse habitat and educate the public about the need and strategy for reducing the spread of invasive species such as cheatgrass and medusa-head. A recent 10 year *statistical analysis revealed that 28% of all fires that burn sage-grouse habitat are human-caused. During the 2014 fire season, teams of fire prevention and education specialists were ordered in Idaho, Oregon and Washington during periods of high fire activity. These teams incorporated sagebrush habitat preservation and invasive species messaging into public education and outreach efforts. The use of sage-grouse as an icon of sagebrush importance is in its infancy, but is a concept which should be carried forward and strengthened. The graphic below is an example of using sage-grouse in fire prevention messaging.

Figure 6. Fire prevention message from Idaho's "One Less Spark" initiative.

Challenges and Barriers

Impediments to federal fire operations and fuels management efforts include:

- Emerging science which synthesizes our knowledge of ecological resilience and potential for success has not been fully integrated into the design and implementation of fuels management projects and fire operations planning.
- The capacity of federal agencies is constrained in terms of positions, funding streams, and planning.
- Real-time information-sharing between sage-grouse biologists and fire managers is sometimes lacking during periods of high fire activity across the Great Basin. This deficiency is found within Incident Management Teams, Area Command Teams, and Geographic Multi-Agency Coordination Groups.
- Competing priorities that exist across program areas impair integration across these functional areas.
- Federal land management agencies planning processes are often delayed or modified as a result of litigation, appeals, and protests of potential treatments.
- The current fire suppression funding process needs to be revised to allow fire operation budget to function more like a "natural disaster" (dedicated dollars available for firefighting) and not fiscally overburden existing program budgets of the federal fire agencies. Currently, there is no single fire budget that covers the entire yearly firefighting effort. Thus, dollars are redirected from other program budgets to make up the difference, which often negatively affects those programs.

III. State Fire and Fuels Management Programs

Western states vary significantly in their approach to managing wildland fire due to variables including the amount and location of private lands, existing land uses, landscape condition, state statutes, codes, regulations, and available resources. Because of the diversity among states and the need for consistent approaches to managing wildland fire a variety of efforts have been undertaken over the last 20 years including the National Fire Plan, the Healthy Forest Restoration Act, the Quadrennial Fire Review process and most recently the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy). Federal, state and local land and wildfire management agencies developed the Cohesive Strategy together to maintain specific individuality while coming together through consensus on common goals and objectives.

Through the implementation of the Cohesive Strategy, the nation as a whole is poised to manage wildland fire in a more unified and efficient manner. The Western Governors Association (WGA) has also taken a leadership role striving for consistent and effective response to wildland fire through active management programs, data and information collection and educational outreach that reduces the threat of catastrophic wildland fire and associated impacts to sagebrush ecosystems. Wildland fire programs operate in those states that are managing sage-grouse and their associated sagebrush ecosystems. To be effective, landscape-scale management of sagebrush ecosystems requires an interagency approach through local level planning processes for projects and activities. State "Action Plans" have, and are being developed to address the coordinated management of wildfire and sage-grouse habitat in specific geographical areas. Specific projects are detailed in the Action Plans to reduce fuels, improve preparedness and initial attack response, identify equipment and training needs, and ensure safe, rapid and aggressive response to wildfire ignitions; and address rehabilitation of wildfire damaged lands to mitigate the spread of invasive plant species.

State wildland fire management responsibilities typically reside in state forestry agencies and are integrated with state natural resource departments and Universities. Partnerships also exist with numerous federal land and natural resource management agencies, that bring the latest technology, research and management tools to the forefront for reducing landscape level, catastrophic wildfires and the spread of invasive plant species. State forestry agencies are delivering a wide variety of wildfire management programs in conjunction with their local and federal cooperators (e.g., prevention, fuels management, preparedness, suppression & rehabilitation).

Process for Fire Suppression Coordination Prioritization

The organic development of wildland fire management capacity and administrative organization across Western states means that there is no one standard model for state fire management. The wildfire management function can be housed in state Departments of Forestry, Natural Resources, Parks and Recreation, and Lands, each having slightly different missions. Some states have comprehensive operational programs while others have only certain components focused more on technical assistance and support of local governmental or other suppression resources. State wildland fire management agencies, despite distinct administrative organization and capacities, have adopted national wildland fire coordination and operational standards, policies, guidance documents and participate in NICC, NMAC, GACCs and local interagency dispatch centers through National Association of State Foresters representatives. State wildland fire management agencies participate through agency specific representatives on state MAC groups and a variety of interagency Boards or Groups focused on coordination decisions. The result is a process which produces consensus for communication, notification and coordination from a statewide perspective including the local level. The interagency integrated approach to wildfire management has proven successful throughout the country and provides for the rapid movement of suppression resources state-to-state or agency-to-agency efficiently.

Fire Operations Programs

Those state wildland fire management agencies with operational capacities operate on an “interagency” basis that includes federal land managers and local governmental entities given wildfire activity, landownership patterns and applicable laws, state statutes and operational agreements. State wildland fire management agencies operations have developed in response to specific jurisdictional responsibilities, such as state lands (e.g., state forests, state parks & wildlife refuges, etc.), while others have assumed (through agreement and/or state statutes) wildland fire management responsibilities for “some” specific non-federal lands (e.g., private lands, city & county lands, etc.) within their state, up to and including “all” non-federal lands on a statewide basis.

So while it is difficult to generalize state wildland fire operational programs, it is possible to identify common operational practices in place with interagency partners. For example, utilization of “closest forces” is an adopted concept shared throughout western states in an effort to keep wildfires small. State and local fire management agencies view all wildfires as “full suppression” incidents and every effort is made to suppress them safely and quickly with a strong initial attack. Many states have agreements with their neighboring states to facilitate a rapid initial attack, regardless of topographical challenges or political boundaries. States, local jurisdictions and interagency partners may manage a wildfire utilizing “unified command” concepts, where impacted jurisdictions participate together in operational decisions providing direction to the designated Incident Commander. For extended attack incidents, states will join with their interagency partners as detailed in the federal agency section in executing a WFDSS for an incident as well as “Delegations of Authority” to an Incident Management Team that takes management responsibilities for a given wildfire. Through all of these documents and protocols sagebrush ecosystems may be prioritized for suppression actions.

Fuels Management Programs

Not all states have the capacity to staff and manage statewide fuels management programs, but a majority of states do support and participate in specific fuels reduction projects on state lands, private lands and federally managed lands to varying degrees depending on capacity and available funding. State forestry agencies focus on non-federal lands, working with private landowners, counties and communities in both the Wildland Urban Interface (WUI) and rural ranching settings.

Projects and activities designed to protect sage-grouse and their sagebrush ecosystems across the west are diverse. Fuels reduction and vegetative management projects are the most common, both at the scale of the individual properties and across multiple ownerships. Fuels reduction in existing highway rights-of-way, utility corridors and designated fuel breaks are ongoing. Areas where pinyon pine and juniper have encroached into sagebrush ecosystems are being treated by mechanical removal on Federal, State, local, and private lands. Hand cutting, pile burning, broadcast burning and utilization of mechanized equipment such as masticators are all techniques being employed by state fire programs in conjunction with federal and local cooperators.

- **State-Specific Challenges and Barriers** Sufficient funding for preparedness activities including training, heavy equipment/engines, PPE, radios, and facilities is often lacking.
- There is inadequate time and funding to comply with expanding NWCG qualification requirements.
- Dedicated year-round work force & associated funding is needed.
- Periods of high wildfire activity with multiple ignitions in short time periods can result in shortages of suppression resources that limit effectiveness.
- Clear delineation of the highest priority sage-grouse habitat designated for protection from wildfire is needed at all levels and should be updated appropriately.
- Active and timely land management, especially on federal lands, suffers from limited funding, permitting requirements, and litigation.
- Extensive delays in processing State-submitted fire bills by the federal agencies can create significant cash flow problems and impacts fuel treatment programs.

IV. Local Fire and Fuels Management Programs

Local programs that contribute to fire and fuels management over the range of sage-grouse include Rural Fire Departments (RFDs), Rangeland Fire Protection Associations, and private landowners through their participation with sanctioned entities. Similar to state-level programs, there is a diversity of local government capabilities specific to emergency services including wildfire suppression. On one hand, some larger urban communities and/or counties with WUI areas have developed state-of-the art capabilities, with 24-hour staffing, and ready availability of engines, tenders, aviation assets and hand crews. Many rural communities and/or counties may be forced to rely on aging federal surplus equipment and an all-volunteer firefighting staff working with limited training and high turnover.

One positive development is the advent of community-based organizations such as Fire Adapted Communities, Fire Safe Councils, Fire Wise and Living With Fire programs that are now established in most western states, counties and communities. These entities facilitate fire prevention activities, pursue grant funding and implement local and landscape-level fuels-reduction projects across multiple ownerships. The combined efforts of these interagency efforts and initiatives have greatly improved wildfire management in counties, cities and communities. They are achieving the associated goals of reducing the occurrence and impacts of large wildfires and reducing loss of sage grouse habitat.

Fire Suppression Coordination/Prioritization

Local governments, urban and rural, are the first responders to all emergency incidents including wildfires within their specific jurisdictions, which are typically delineated by geographic boundaries as a fire district or an agreed-upon response area. Response capability is measured by "level of service" typically desired and funded by the landowners within the fire district. Rural communities typically field a volunteer fire department with varying levels of qualified members, equipment and training. In almost all cases though, local and rural fire departments have adopted NFPA and NWCG standards and qualifications and train their members to those national standards.

Whether an emergency incident is a structure fire, vehicle accident, medical or a wildfire ignition, the first notification is to the local area dispatch center through their 911 system. In the case of a wildland fire incident, once the first responders are on scene and the incident assessed, the coordination and management of the wildfire incident may or may not be transferred to an interagency dispatch center operated jointly by federal and state agencies specifically for wildfire coordination and prioritization. Time of year, level of ongoing emergency activity and size/location/fuel conditions all influence how a wildfire response is managed at the local level. In some areas of the country wildfire ignitions never go any further than the local dispatch center. Interagency dispatch centers are likely to be called on if the ignition occur during "wildfire season" (e.g., May-August) and if it has the potential to threaten public safety, structures and adjacent lands. These incidents are then incorporated into the interagency process for wildfire coordination and prioritization.

Fire Operations Program

Significant differences also exist across the western landscape for the management of wildland fire at the local level. Land ownership, vegetation, topography and urban development patterns typically drive wildland fire response capacities. Community capacity varies greatly and may range from a well- staffed, trained and equipped "all-risk" fire department to a volunteer fire department with limited resources or individual ranch owners with a single piece of equipment. Several states now have added "Rangeland Fire Protection Associations" (RFPA) as a component to their volunteer and paid fire services in those rural areas not served by any other means. RFPA's vary in scope, but can be described as non-profit, non-governmental entities primarily comprised of individual ranchers and landowners. Their ability to provide improved initial attack response to wildfire ignitions is reducing the threat of catastrophic wildfires in rural areas of the west. Local governments, volunteers and RFPA's are often the first responders across western states to wildfire ignitions in sagebrush ecosystems, particularly outside of an average wildfire season. It may be hours before additional federal and/or state resources reach an incident in rural areas, thus it is important to sustain local response capabilities.

Most federal and state wildland fire programs are designed and managed around their respective fire seasons, rather than staffed year-round. Several western states are expanding year-round wildfire management capabilities in concert with local governments, given the lengthening of fire seasons beyond historic norms. During those periods when state and federal resources are reduced or may not be available, (fall, winter & early spring) response to wildfire ignitions falls to local government, volunteers and RFPA organizations.

As mentioned previously, the interagency wildfire partnership, structured now within the Cohesive Strategy, includes local government, volunteers and RFPA organizations. At the local level, training and equipping firefighters is achieved in a variety of ways, but an interagency approach is most common. Annual refresher training and required firefighter courses are open to all entities and typically held annually in numerous locations. Federal excess fire equipment is often acquired by state forestry agencies and rebuilt for distribution on a local level. Federal land managers allocate excess fire equipment directly to local governments for their use.

Fuels Management Program

A wide variety of habitat improvement and fuels reduction projects are being implemented on the ground throughout the west, including critical implementation elements at the local level. Water resources, riparian areas and meadows, key to healthy sage-grouse habitat are often in private landownership due to settlement patterns in the west. Private landowners are utilizing both state and federal cost-share programs to improve and protect habitat for sage-grouse in conjunction with their specific land management activities. Designing fuel treatment projects with connectivity across ownerships is increasing, although complications related to NEPA compliance when projects involve federal lands is an issue.

In the WUI areas of the west, communities and local governments are taking responsibility for their jurisdictional lands, educating landowners, designing fuels treatments, pursuing grants and implementing fuels reduction projects. While there is an increasing effort to integrate non-federal land treatments with adjacent federal lands projects, fuels treatment projects often do not line up due to timing and funding challenges. A landscape treatment approach is increasingly viewed as the desired strategy, but navigating project permit processes, including the public review requirements of NEPA, securing sufficient funding and finding qualified contractors remain challenges.

Local Challenges and Barriers

Local Government challenges include:

- Firefighter retention and the loss of institutional knowledge of managing wildfire;
- There is insufficient funding for preparedness and response capacity including training, heavy equipment/ engines, PPE, radios, and facilities.
- Shortages of qualified wildfire management trainers, programs and inadequate delivery systems in rural areas create operational constraints.
- Inconsistent federal land management policies are negatively impacting the sustainability of multiple land uses on public lands.
- There is a significant need for developing and utilization of integrated and dynamic livestock grazing plans that assist with fuels reduction through targeted grazing and consistent monitoring.
- It is difficult to implement a landscape approach to fuels management because of challenges posed by environmental regulations, the availability of sufficient funding, the lack of qualified contractors and the complicated NEPA permit process.

V. Positioning For the Future

The scope of future sage-grouse conservation is enormous. In order to make meaningful progress, collaborative efforts that tie proven technology with strategic placement of management activities will be required. Existing fire programs that provide opportunities for sage-grouse conservation at meaningful scales are identified below. Examples of practices and partnerships making a positive difference for sage-grouse are also identified and discussed. The section concludes with a synthesis of future needs in the fire and fuels management functions.

Example 1: Rangeland Fire Protection Associations

Rangeland Fire Protection Associations (RFPAs) are non-profit corporations established to prevent and suppress rangeland fires, and are governed and directed by its members. These associations require State legislation, status as non-profit entities, and operate under a Cooperative Rangeland Fire Protection Agreement. Creation of RFPAs is a collaborative effort between local ranchers, State Government, and the Federal Government (typically the BLM or USFS). Local boards and grants generate funding. Federal and State agencies provide equipment and training for RFPAs. Day-to-day operations of RFPAs are spelled out in annual operating plans and memorandums of understanding that are annually updated. The benefits of RFPAs include: (1) faster initial response to small fires; (2) allowing ranchers the ability to protect forage resources important to their livelihood; (3) ensuring firefighting safety through adoption of standardized firefighting practices, equipment, and communication; (4) where sage-grouse are represented on the local landscape, better awareness of sage-grouse habitat by the ranching community.

Figure 7. Engaging ranchers and rural communities in fire management through RFPAs taps local knowledge and expertise in further protecting resource values. (Photo courtesy: Jeremy Maestas, NRCS).

In 2014, Oregon has 17 operational RFPAs and Idaho has five. Nevada does not have RFPAs, but is introducing legislation that would authorize their formation in future years. See Appendix 6 for the RFPA formation checklist.

How do RFPAs affect sage-grouse conservation?

While retention of grazing opportunities is a key incentive for RFPAs, sage-grouse conservation can also be a direct beneficiary of their services. Because federal agencies interface with RFPAs regarding values to be protected, the locations and extent of sage-grouse habitats are directly applied by RFPAs in how they manage wildland fires. RFPAs can also contribute to sage-grouse conservation with other local interests through promoting awareness of habitat location and importance.

Example 2: Cooperative Landscape Approaches

South Warner Juniper Removal Project

Warner Mountains, Oregon (2010-2020)

Partners: BLM-Lakeview Resource Area, Private Landowners/Permittees, NRCS Sage Grouse Initiative, Oregon Department of Fish and Wildlife, University of Idaho, Oregon State University, Lake County Watershed Council, Intermountain West Joint Venture, Point Blue Conservation Science

The South Warner Project is a landscape-scale partnership working seamlessly across public and private and public lands to remove encroaching conifers in and around the Western Great Basin PAC of south-central Oregon. Expansion and infill of western juniper into sagebrush communities affects large portions of the western range, fortunately, many areas are still in the early stages of woodland succession, which affords

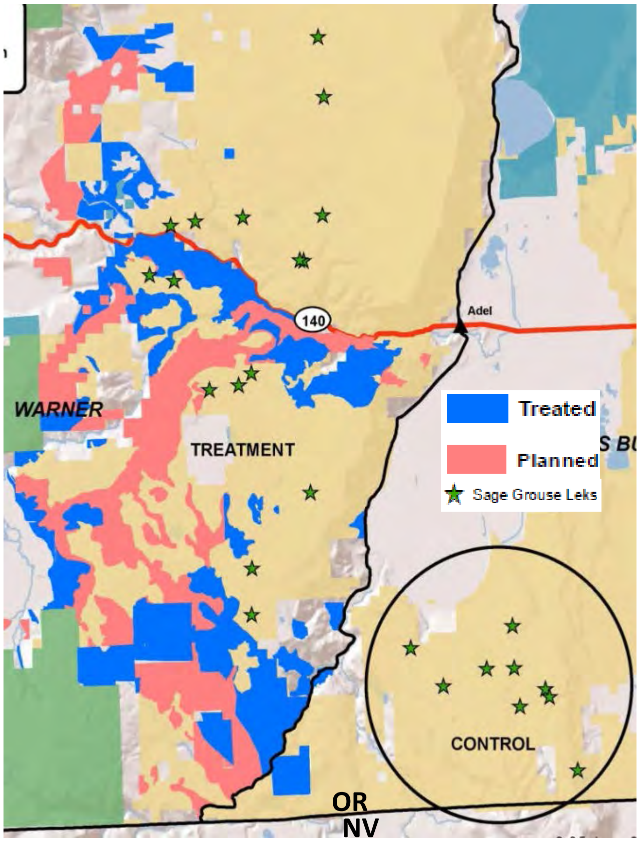


Figure 8 South Warner project area, Oregon. Polygons depict juniper removal treatments as of 2013.

opportunities to proactively remove trees before sage-grouse are displaced by habitat conversion.

BLM and private landowners, with support from the NRCS Sage Grouse Initiative and other partners, are working side-by-side to remove encroaching conifers trees and reconnect large, intact sagebrush rangelands. Over 47,000 acres are being treated which encompasses most of the post-settlement trees in this 100,000-acre area. BLM treatments total 25,000 acres, while private landowner treatments exceed 22,000 acres. Roughly half of planned treatments have already been completed. Junipers are removed primarily through hand cutting with chainsaws. Slash is reduced through a variety of techniques including lop-and-scatter, single tree burning, and pile burning to reduce fuels and vertical structure. All treatments are designed to maximize retention of sagebrush and other native vegetation. Long-term, outcome-based evaluations are also underway in this landscape to assess sage-grouse and sagebrush-obligate songbird response to conifer encroachment and removal. University of Idaho researchers are in the final field season of a five-year management study to assess the effects of conifer encroachment and subsequent removal on sage-grouse and their habitats, with a second phase of research beginning this fall for another five years. The non-profit group Point Blue Conservation Science is also assessing songbird responses to conifer treatments to provide a more holistic understanding of treatment effects. These science evaluations are helping

Figure 9 Chainsaw tree removal allows retention of sagebrush

Figure 10 Before (top) and after (bottom) treatment. Photos by: BLM

inform conservation delivery and adaptive management range-wide.

Burley Landscape Sage-Grouse Habitat Restoration Project

Cassia County, Idaho (2012-2017)

Partners: BLM-Burley Field Office, Private Landowners/Permittees, NRCS Sage Grouse Initiative, Pheasants Forever, Idaho Department of Fish and Game, Mule Deer Foundation, U.S. Fish & Wildlife Service, West Cassia Soil and Water Conservation District, South Magic Valley Sage-Grouse Local Working Group

The Burley Project is an innovative collaboration across public and private lands reducing the threat of conifer encroachment to sage-grouse and sagebrush ecosystems in the Northern Great Basin PAC of southern Idaho. Encroachment of Utah juniper in this area threatens persistence of sage-grouse and other sagebrush obligate species, as well as, increases the risk of catastrophic wildfire due to heavy and continuous fuel loads.

The project's overall objective is to remove juniper across about 38,000 acres of BLM land by 2017; over 11,000 acres have already been completed. Additional treatments are also being implemented on adjacent state and private lands to enhance connectivity. Treatments are prioritized in and around priority grouse habitats, such as, breeding areas near leks. Mechanical treatment techniques, including chainsaws and masticators, are employed to carefully remove juniper while retaining understory sagebrush, grasses, and forbs to the maximum extent possible. The vast majority of treatment areas are still in early stages of juniper expansion.

Figure 11. Days after treatment, sage-grouse take advantage of habitat recently reclaimed from dense juniper invasion. Photo by: BLM.

Project partners are combining technical and financial resources to overcome barriers to get the job done on the ground. BLM resource experts completed initial planning and NEPA, but limited fuels budgets necessitated a partnership to implement the project. The NRCS Sage Grouse Initiative now provides most of the needed funding for treatments through the Farm Bill's Environmental Quality Incentives Program, with

How does cooperative landscape planning affect sage-grouse conservation?

Cooperative landscape planning leverages the diverse resources, skills, and knowledge of multiple partners for the benefit of sage-grouse. Many working groups involve private, state, and federal cooperators, which illustrates the benefits that come from multiple contributors working at landscape scales. The Sage-Grouse Initiative led by the NRCS is one example of a cooperative landscape approach.

matching funds provided by Idaho Department of Fish and Game and others. NRCS coordinates conservation plans and contracts with local permit-holding ranchers on public lands to enable the work. Pheasants Forever facilitates project implementation across land ownerships through a Stewardship Agreement with BLM. PF hires contractors for implementation, administers contracts, and jointly conducts project inspection on contractor work with BLM project representatives. This project serves as a model for how partners can combine resources to accelerate implementation across private and public lands throughout the West.

Example 3: Application of Resistance and Resilience Concepts

The recently completed General Technical Report describing resistance and resilience concepts (Chambers et al. 2014) is a fundamental synthesis of scientific knowledge with great promise to land managers. This report is intended for broad application in the development of ecologically based management strategies and practices for fuels management, fire operations, habitat restoration, and rehabilitation efforts. Many land management units, such as BLM Districts or National Forests, have applied these concepts in the past with success. The following photos highlight a project which successfully established Wyoming big sagebrush following the 2006 Esmeralda Fire in northeast Nevada, by evaluating site specifics and incorporating resistance and resilience concepts in developing the type and timing of treatments.

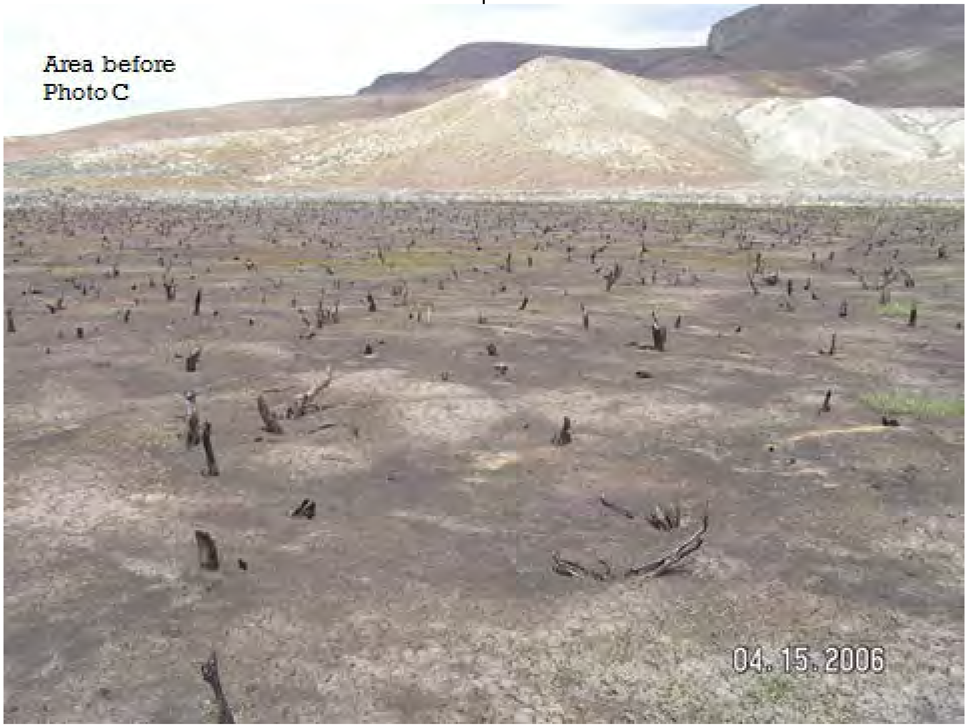


Photo 1. Post-fire landscape following 2006 Esmeralda Fire, Elko BLM District (photo courtesy Tom Warren, Elko BLM.


Area after aerial seeding and pipe harrow treatment.
Photo C1
Photo taken 2009

Photo 2. Rehabilitation results two years following the 2006 Esmeralda Fire, Elko BLM District (photo courtesy Tom Warren, Elko BLM


Photo taken June 2011
Photo C2

Photo 3. Rehabilitation results five years following the 2006 Esmeralda Fire, Elko BLM District (photo courtesy Tom Warren, Elko BLM.

Example 4: Linear Fuel Breaks

In the spring of 2012, the BLM's Upper Snake Field Office implemented its first phase of the Big Desert Fuel Breaks Project, as planned in the March 2012 Environmental Assessment of the Big Desert Roads Fuel Breaks Project. The intent of the project was to modify potential fire behavior characteristics (e.g., rate of spread, flame length) adjacent to road corridors in order to protect the remaining intact sagebrush habitat within the field office, and to improve firefighter safety. The initial treatment phase of this plan consisted of mowing approximately 30 miles (1,130 acres) of vegetation adjacent to strategic road corridors. Work was initiated on April 30, 2012 and consisted of roto-mowing the existing vegetation to a height of 8 inches at a distance between 100-150 feet from the centerline, creating fuel breaks 200-300 feet in width. Additionally, the new plan allowed for areas previously treated to be retreated mechanically or with approved herbicides to reduce shrub densities and reduce fuel continuity by removing annual grasses from within the interspaces. To date, approximately 230 acres have been retreated using the chemical method.

The Cox's Well Fire ignited on the afternoon of July 10, 2012 within the NPS Craters of the Moon National Monument and Preserve. Daytime temperatures during the fire ranged between 85-98°F and fire danger indices were extreme. Due to the passage of numerous thunderstorms, fire activity was erratic, resulting in the fire actively burning on multiple flanks. Strong, gusty winds and hot dry conditions allowed the fire to quickly reach 4,575 acres of public lands administered by the BLM's Upper Snake Field Office and 3,225 acres of BLM Monument lands located within the Craters of the Moon National Monument.

Suppression operations of the Cox's Well Fire began around 13:30 with initial attack crews attempting to anchor and tie the fire into the Great Rift within the BLM Monument Lands. When direct attack was unsuccessful, crews backed out to the Arco/Minidoka Road and started improving the road grade and back burning off the road. Recently completed fuel breaks (spring 2012) along the Arco/Minidoka Road served to augment suppression operations. Treated fuels exhibited flame lengths of approximately two feet, providing an area for suppression crews to safely and effectively manage the fire.

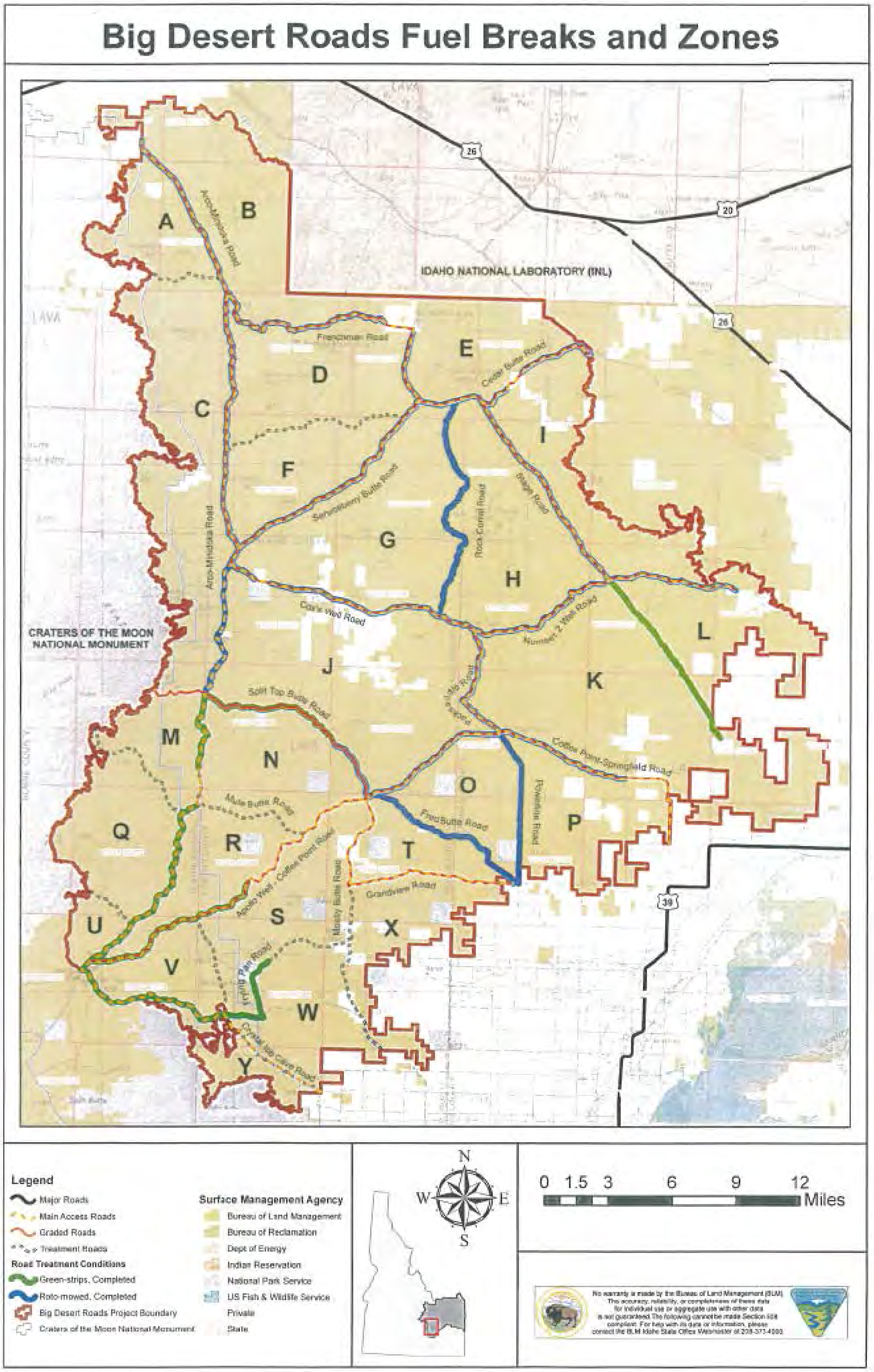


Figure 12. Map of Big Desert fuel break and landscape compartments.

Figure 13. Overview of the fuel breaks size and vegetative height and distribution

Figure 14. Overview of the burned and unburned portions of the fuel breaks following the Cox's Well Fire (photos courtesy Ben Dyer, BLM Fire Ecologist)

VI. Summary and Recommendations

Proactive measures in the fire operations and fuels management arenas are crucial to long-term sage-grouse conservation. Approximately 97% of initial attack efforts are successful at keeping fires under 1,000 acres. Site-appropriate measures before and after the fire represent the greatest opportunities to interrupt the invasive plant and wildfire cycle, and potentially augment initial attack effectiveness. At the same time, the body of knowledge related to "what works" should be bolstered through research and testing.

It is critical to note that there are common themes that are repeated in on-going science assessments dealing with wildland fire and sage-grouse. In the USGS Sage-Grouse Science Needs Assessment, the BLM's Fire and Rangelands symposium report, and in this document, there is glaring overlap in the identified science, policy, and funding needs. Given the wide range of the scientists contributing to these reports, this overlap should be acknowledged as significant.

In the suite of recommendations which follow, some can be readily addressed in the short term. Others will require long-term institutional change through the development of new policy. In any case, disrupting the feedback loop between wildfire and the loss of sagebrush is daunting. The biological barriers to sage-grouse conservation are well understood (Knick et al. 2011), though extraordinary in scope and complexity. Policy and funding barriers have been recently clarified through this and other reports. Surmounting these barriers will require collaboration, persistence and creativity. Our recommendations represent areas where meaningful change can result in the policy, research, and applied management arenas. To aid the reader in better understanding the genesis of these recommendations, we have restated the challenges and barriers identified in Sections II through IV of this report below.

From Section II: Federal Challenges and Barriers

- Emerging science that synthesizes our knowledge of ecological resilience and potential for success has not been fully integrated into the design and implementation of fuels management projects and fire operations planning.
- The capacity of federal agencies in terms of positions, funding streams, and planning is limited.
- Real-time information sharing between sage-grouse biologists and fire managers is sometime lacking during periods of high fire activity across the Great Basin. This deficiency is found within Incident Management Teams, Area Command Teams, and Geographic Multi-Agency Coordination Groups.
- Competing priorities exist across program areas. Integration across these functional areas needs improvement.
- Required public review processes, including litigation, appeals, and protests of potential treatments, impede the finalization of land-use plans.
- The current fire suppression funding process needs to be modified to allow fire operations to function more like a "natural disaster" and not fiscally overburden existing program budgets of the federal fire agencies. Currently, there is no single fire budget that covers the entire yearly firefighting effort. Thus, dollars are

redirected from other program budgets to make up the difference, which often negatively affects those programs.

From Section III: State Challenges and Barriers

- There is insufficient funding for wildfire preparedness activities, including training, heavy equipment/engines, Personal Protective Equipment, radios, and facilities.
- Expanding National Wildfire Coordinating Group (NWCG) qualification requirements and associated time required results in shortages of qualified personnel in many positions;
- The historic seasonal approach to wildfire suppression and management is inadequate given the complexities of natural resource management. A dedicated year round work force and associated funding is needed to address the expanding wildfire management challenges;
- Periods of high wildfire activity with multiple ignitions in short time periods, which results in shortages of suppression resources can limit response effectiveness;
- Clear delineation of the highest priority sage-grouse habitat designated for protection from wildfire is needed at all wildfire response levels and mapping updated appropriately;
- There is a lack of active and timely land management actions, especially on federal lands, due to limited funding, permitting requirements, and litigation;
- Extensive delays in processing fire bills by the federal agencies can create significant cash flow problems and impacts state and local fuel treatment programs;
- Wildfire rehabilitation funding is limited, which perpetuates the invasive plant species problems and increases fire return intervals on all ownerships.

From Section IV: Local Challenges and Barriers

- Firefighter retention and the loss of institutional knowledge of managing wildfire;
- There is insufficient funding for preparedness and response capacity including training, heavy equipment/engines, PPE, radios, and facilities.
- Shortages of qualified wildfire management trainers, programs and inadequate delivery systems in rural areas create operational constraints.
- Inconsistent federal land management policies are negatively impacting the sustainability of multiple land uses on public lands.
- There is a significant need for developing and utilization of integrated and dynamic livestock grazing plans that assist with fuels reduction through targeted grazing and consistent monitoring.
- It is difficult to implement a landscape approach to fuels management because of challenges posed by environmental regulations, the availability of sufficient funding, the lack of qualified contractors and the complicated NEPA permit process.
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Recommendation #1: Utilize Emerging Science

Incorporate emerging science and analysis (Resistance and Resilience concepts, FIAT Fire and Invasives Assessments) to place management strategies and treatments in the locations with the highest probability of success. While many administrative units have applied knowledge of ecological sites and resilience in past practices, a broader adoption of the resistance/resilience concept is needed and overdue. Emerging science concepts allow managers to prioritize management efforts and scarce resources to achieve successful outcomes. One example would be a broader use of FIAT assessments to apply “the right treatments in the right place”.

Recommendation #2: Fuel Breaks

Conduct research that quantifies fuels treatment effectiveness in terms of limiting fire growth, final fire size, or aiding suppression effectiveness. Currently, the metrics used to evaluate fuels treatment effectiveness are subjective, qualitative, or lack causal relationship (e.g., observed change in fire behavior, dollars spent, acres treated). Current assumptions regarding linear fuel breaks, green-stripping, and other treatments need to be tested and their outcomes quantified. Studies should evaluate variables that include the timing, sequence, and pattern of treatments.

Once the most effective fuel-break techniques are identified, scale up implementation of strategically placed fuel breaks in priority PACS and FIAT focal habitat areas to proactively address the 3% of fires that escape initial attack. While linear fuel treatments may potentially fragment habitats, “mega-fires” eliminate habitat. Managers should consider application of fuel management strategies that can augment suppression effectiveness and reduce the likelihood of catastrophic fire growth.. While fuel breaks are not intended to stop fires, they can help reduce fire size by providing firefighters with safe anchor points for suppression. Development of effective pre-suppression strategies should be identified through interdisciplinary efforts involving both sage-grouse biologists and fire managers.

Recommendation #3: Involve the Experts

State and federal biologists with sage-grouse expertise and invasive species should inform fire management decisions in Incident Management Teams, Area Command Teams, and Geographic Multi-Agency Coordination groups. This should include increased participation of non-federal Resource Advisors on the line, as well as subject matter experts in real-time decision making with Incident Management Teams. Coordination should also occur before fire season to ensure the real-time participation of key biologists with knowledge of lek locations, populations, and seasonal habitats. All of the above must comply with NWCG qualifications and standards for fireline personnel. A mechanism for overtime compensation for non-federal employees is needed.

Recommendation #4: Promote Awareness

Develop a process whereby sage-grouse and their habitats are highlighted as a high-priority value in the above discussions for the public and. Currently, sage-grouse is viewed as one of myriad natural resource values to consider during fire operations decisions. Sage-grouse sensitivity to fire effects should be highlighted in allocation decisions (e.g., slow recovery of sagebrush ecosystems, bird affinity for lek locations, biological significance of intact sagebrush, etc.). This awareness must highlight the need to minimize fire growth on fires that threaten valued habitat.

Recommendation #5: Incorporate Sage-Grouse Considerations in Pre-Season Activities

Fully incorporate sage-grouse information sharing, planning, and coordination in pre-season meetings. This should include full discussions related to delegations of authority, the process for in-briefings, resource advisor roles, and participation by area wildlife biologists with incident managers when fires occur.

Recommendation #6: Invest now to save later

Develop reliable funding streams focused on pre-fire vegetation management to improve sage-grouse habitat and improving sagebrush ecosystem resilience. This provides continuity for out-year planning and staffing. Prioritize vegetation management opportunities in priority areas identified through the FIAT process where cooperative landscape approaches are being taken across public-private land ownership boundaries. Acknowledge the reality that need for multiple interventions, repeated treatments, and adaptive management will likely exceed agencies' current budgets. Maximize the impact of new funding streams by prioritizing support for collaborative landscape approaches.

Recommendation #7: Streamline Planning Processes

Work with CEQ to explore mechanisms for accelerating NEPA planning for implementation of key vegetation treatments in priority landscapes identified through the FIAT process to provide real-time protection capability. With current planning efforts often spanning years, increasing fire frequency and magnitude are outpacing our ability to keep up with implementation.

Recommendation #8: Update Fire Management Plans

Based upon our knowledge of sage-grouse populations, habitats, and related threats, implement the decisions from the revised land use plan EIS's in order to update fire management plans. Subsequently, agencies should revisit operational plans related to fire prioritization, resource placement, and suppression response procedures. Integrate lek, population, and key habitat data into fire management response protocols for Federal and State agencies.

Recommendation #9: Improve Decision Support Tools

Develop decision support tools that contribute to rangeland fire management decision-making. One specific technical gap is rangeland fire behavior modeling (dynamic fuel modeling). Currently, predicting the dynamics of fire behavior in forested systems is more advanced than that in rangeland ecosystems. This is a technical gap that needs to be closed to improve future treatment planning and fire management decisions.

Recommendation #10: Adopt an "All Lands" Approach

Develop an "all lands" solution to wildfire and fuels management relative to sage-grouse habitat conservation. Rangeland Fire Protection Associations represent a key component of incorporating private and ranching interests. Expand the cooperation between federal agencies, state fire agencies and local governments to establish RFPAs on a broader scale. Develop commitments to provide training and equipment to RFPAs. Expand training opportunities to include volunteer firefighters, RFPA's, and local fire departments. Expand model programs such as “Partners in Conservation and NRCS “Sage Grouse Initiative” to develop innovative funding mechanisms for landscape scale habitat restoration projects across multiple ownerships.

Recommendation #11: Model Fire Funding on Disaster Response

Finalize proposed legislation that allows fire management (suppression) to be funded like natural disasters, as identified in the 2014 WAFWA Gap Report. The current fire suppression funding process should be modified to where fire costs are funded akin to “natural disasters”, thereby easing fiscal competition in federal and state agencies.

Recommendation #12: Evaluate Grazing as a Fuels Management Opportunity

In concert with research needs identified by USGS and the 2014 WAFWA Gap Analysis, conduct research on the efficacy and opportunities related to livestock grazing as a fuels management tool. Given the high degree of overlap between domestic livestock grazing and sage-grouse habitats, evaluate variables associated with grazing intensity, timing, and extent to determine value as a fuels management tool.

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VII. Appendices

Appendix 1. Glossary of Terms

Source: NWCG Glossary of Wildland Fire Terminology PMS 205 (2014)

Agency
An administrative division of a government with a specific function, or a non-governmental organization (e.g., private contractor, business, etc.) that offers a particular kind of assistance. A federal, tribal, state or local agency that has direct fire management or land management responsibilities or that has programs and actives that support fire management activities.
see also: Assisting Agency
Cooperating Agency
Supporting Agency

Agency Administrator
The official responsible for the management of a geographic unit or functional area. The managing officer of an agency, division thereof, or jurisdiction having statutory responsibility for incident mitigation and management. Examples: NPS Park Superintendent, BIA Agency Superintendent, USFS Forest Supervisor, BLM District Manager, FWS Refuge Manager, State Forest Officer, Tribal Chairperson, Fire Chief, Police Chief.
see also: Line Officer

Agency/Area Coordination Center
A facility which serves as a central point for one or more agencies to use in processing information and resource requests. It may also serve as a dispatch center for one of the agencies.

Anchor Point
An advantageous location, usually a barrier to fire spread, from which to start constructing a fire line. The anchor point is used to minimize the chance of being flanked by the fire while the line is being constructed.

Area Command
An organization established to: 1) oversee the management of multiple incidents that are each being handled by an incident management team (IMT) organization; or 2) to oversee the management of a very large incident that has multiple IMTs assigned to it. Area Command has the responsibility to set overall strategy and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and that objectives are met and strategies followed.

Backfire
A fire set along the inner edge of a fire line to consume the fuel in the path of a wildfire or change the direction of force of the fire's convection column.

Backfiring
A tactic associated with indirect attack, intentionally setting fire to fuels inside the control line to slow, knock down, or contain a rapidly spreading fire. Backfiring provides a wide defense perimeter and may be further employed to change the force of the convection column. Backfiring makes possible a strategy of locating control lines at places where the fire can be fought on the firefighter's terms. Except for rare circumstance meeting specified criteria, backfiring is executed on a command decision made through line channels of authority.

Barrier
Any obstruction to the spread of fire. Typically an area or strip devoid of combustible fuel.

Blackline
Pre-burning of fuels adjacent to a control line before igniting a prescribed burn. Blacklining is usually done in heavy fuels adjacent to a control line during periods of low fire danger to reduce heat on holding crews and lessen chances for spotting across control line. In fire suppression, a blackline denotes a condition where there is no unburned material between the fire line and the fire edge.

Burn Out
Setting fire inside a control line to consume fuel between the edge of the fire and the control line.
see also: Backfire

Contained
The status of a wildfire suppression action signifying that a control line has been completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire's spread.

Cooperating Agency
An agency supplying assistance including but not limited to direct tactical or support functions or resources to the incident control effort (e.g. Red Cross, law enforcement agency, telephone company, etc.).
see also: Agency
Agency Representative
Assisting Agency
Supporting Agency

Cooperator
A federal, tribal, state, or local agency that participates with another agency(s) in planning and conducting fire or emergency management projects and activities.
see also: Agency
Agency Representative
Assisting Agency
Cooperating Agency
Supporting Agency

Coordination Center
Term used to describe any facility that is used for the coordination of agency or jurisdictional resources in support of one or more incidents.

Direct Attack
Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.
synonym: Direct Line

Direct Line
Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.
synonym: Direct Attack

Dispatch Center
A facility from which resources are assigned to an incident.

Dispatcher
A person who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control efforts.
see also: Agency Dispatcher

Dry Lightning Storm
Thunderstorm in which negligible precipitation reaches the ground. Also called dry storm.

Emergency Stabilization
Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resource, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources.

Extreme Fire Behavior
"Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.
see also: Blowup
Fire Storm
Flare-up

Fine Fuels
Fast-drying dead or live fuels, generally characterized by a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a time lag of one hour or less. These fuels (grass, leaves, needles, etc.) ignite readily and are consumed rapidly by fire when dry.

Fire Behavior
The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Management Plan (FMP)
A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. A fire management plan defines a program to manage wildland fires (wildfire and prescribed fire). The plan is supplemented by operational plans, including but not limited to preparedness plans, preplanned dispatch plans, prescribed fire burn plans, and prevention plans. Fire management plans assure that wildland fire management goals and components are coordinated.

Fire Management Unit (FMU)
A land area definable by specified management objectives, constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and other defined elements that set it apart from an adjacent area. The primary purpose of developing Fire Management Units in fire management planning is to assist in organizing information in complex landscapes. A fire management unit may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire Presuppression
Activities undertaken in advance of fire occurrence to help ensure more effective fire suppression. Activities includes overall planning, recruitment and training of fire personnel, procurement and maintenance of firefighting equipment and supplies, fuel treatment and creating, maintaining, and improving a system of fuel breaks, roads, water sources, and control lines.

Fire Weather
Weather conditions which influence fire ignition, behavior, and suppression.

Fire Weather Forecast
A weather prediction specially prepared for use in wildland fire operations and prescribed fire.

Firebreak
A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire line
The part of a containment or control line that is scraped or dug to mineral soil.

Fuel Arrangement
1 A general term referring to the spatial distribution and orientation of fuel particles or pieces.

Fuel Bed
An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.

Fuel Loading
The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available fuel (consumable fuel) or total fuel and is usually dry weight.

Fuel Reduction
Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Treatment
Manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling and burning).
synonym: Fuel Modification

Fuel break
A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

Geographic Area Coordinating Group (GACG)
An interagency body of fire management representatives from each federal and state land management agency within a nationally recognized regional area that provides leadership and support to facilitate safe and efficient fire management activities. Working collaboratively, a GACG's mission is not only for wildland fire emergencies, but for other emergency incidents, as necessary.

Geographic Area Coordination Center (GACC)
The physical location of an interagency, regional operation center for the effective coordination, mobilization and demobilization of emergency management resources. A coordination center serves federal, state and local wildland fire agencies through logistical coordination of resources throughout the geographic area, and with other geographic areas, as well. Listings of geographic coordination centers and their respective geographic coordinating areas can be found within the National Interagency Mobilization Guide.
see also: Geographic Area
Geographic Coordinating Area

Geographic Multi-Agency Coordination (GMAC) Group
Interagency group within a geographic which convenes during periods of high fire activity to:
(1) determine and set geographic area priorities;
(2) acquire, allocate, and reallocate resources; and
(3) issue coordinated situation assessment statements.

Head of a Fire
The most rapidly spreading portion of a fire's perimeter, usually to the leeward or up slope.

Hotshot Crew
Intensively trained fire crew used primarily in hand line construction (Type-1).

Incident
An occurrence either human-caused or natural phenomenon, that requires action or support by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Incident Action Plan (IAP)
Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map. Formerly called shift plan.

Incident Commander (ICT1, ICT2, ICT3, ICT4, or ICT5)
This ICS position is responsible for overall management of the incident and reports to the Agency Administrator for the agency having incident jurisdiction. This position may have one or more deputies assigned from the same agency or from an assisting agency(s).

Incident Management Team
The incident commander and appropriate general and command staff personnel assigned to an incident.

Incident Meteorologist (IMET)
A specially trained meteorologist who provides site specific weather forecasts and information at an incident. The individual works under the direction of the fire behavior analyst and the planning section chief.

Incident Objectives
Statements of guidance and direction necessary for the selection of appropriate strategy(s), and the tactical direction of resources. Incident objectives are based upon agency administrators direction and constraints. Incident objectives must be achievable and measurable, yet flexible enough to allow for strategic and tactical alternatives.

Initial Attack (IA)
A preplanned response to a wildfire given the wildfire’s potential. Initial attack may include size up, patrolling, monitoring, and holding action or suppression.

Jurisdictional Agency
The agency having land and resource management responsibility for a specific geographical or functional area as provided by federal, state or local law.

Land Use Plan
A set of decisions that establish management direction for land within an administrative area; an assimilation of land-use-plan-level decisions developed through the planning process regardless of the scale at which the decisions were developed.

Land/Resource Management Plan (L/RMP)
A document prepared with public participation and approved by an agency administrator that provides general guidance and direction for land and resource management activities for an administrative area. The L/RMP identifies the need for fire's role in a particular area and for a specific benefit. The objectives in the L/RMP provide the basis for the development of fire management objective and the fire management program in the designated area.

Leader's Intent
A concise statement that outlines what individuals must know in order to be successful for a given assignment. The intent communicates three essential pieces of information:
- Task – What is the goal or objective
- Purpose – Why it is to be done
- End state – How it should look when successfully completed

Lightning Activity Level (LAL)
Part of the National Fire Danger Rating System (NFDRS). A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning (forecasted or observed). The scale for 1 to 5 is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2). LAL 6 is a special category for dry lightning and is closely equivalent to LAL 3 in strike frequency.

Line Officer
Managing officer, or designee, of the agency, division thereof, or jurisdiction having statutory responsibility for incident mitigation and management.
see also: Agency Administrator

Local Agency
Any agency having jurisdictional responsibility for all or part of an incident.

Local Resource
Resources within a dispatch center's area of responsibility.

Mobilization
The process and procedures used by all organizations, federal, state and local, for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Mobilization Guide
A written description of procedures used by federal, state, and local organizations for activating, assembling, and transporting resources that have been requested to respond to or support an incident.

Mop Up
Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke.

Multi-Agency Coordinating Group (MAC Group)
A national, regional, or local management group for interagency planning, coordination, and operations leadership for incidents. Provides an essential management mechanism for strategic coordination to ensure incident resources are efficiently and appropriately managed in a cost effective manner.

Multi-Agency Coordination (MAC)
A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Multi-Agency Coordination System (MACS)
MACS provides the framework to support coordination for incident prioritization, critical resource allocation, communication systems integration, and information coordination. MACS components include facilities, equipment, emergency operating centers EOCs), specific multiagency coordination entities, personnel, procedures, and communications.

Multiple Fire Situations
High fire frequency over a short period of time in an administrative unit, usually overtaxing the normal initial attack capability of the unit.

National Fire Danger Rating System (NFDRS)
A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Interagency Coordination Center (NICC)
Coordinates allocation of resources to one or more coordination centers or major fires within the nation. Located in Boise, Idaho.

National Interagency Fire Center (NIFC)
A facility located at Boise, Idaho, jointly operated by several federal agencies, dedicated to coordination, logistical support, and improved weather services in support of fire management operations throughout the United States.

National Multi-Agency Coordination (NMAC) Group

During National Preparedness Levels 4 and 5, the National Multi-Agency Coordinating Group (NMAC) is activated and daily briefings are conducted. This body involves representatives from all federal fire agencies, the National Association of State Foresters, and the Federal Emergency Management Administration (FEMA). This group provides national wildland fire operations direction, coordination, prioritization, allocation and oversight.

National Wildfire Coordinating Group (NWCG)
An intergovernmental body that provides national leadership to develop, maintain and communicate standards, guidelines, qualifications, training, and other capabilities that enable interoperable operations among federal and non-federal entities for wildland fire program management.

Natural Barrier
Any area where lack of flammable material obstructs the spread of wildfires.

Overhead
Personnel assigned to supervisory positions, including incident commander, command staff, general staff, branch directors, supervisors, unit leaders, managers and staff.

Predictive Services
Those Geographic Area and National-level fire weather or fire danger services and products produced by wildland fire agency meteorologists and intelligence staffs in support of resource allocation and prioritization.

Preparedness
1 Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.
2 Mental readiness to recognize changes in fire danger and act promptly when action is appropriate.
3 The range of deliberate, critical tasks, and activities necessary to build, sustain, and improve the capability to protect against, respond to, and recover from domestic incidents.

Preparedness Level
Increments of planning and organization readiness commensurate with increasing fire danger.

Prescribed Fire
Any fire intentionally ignited by management actions in accordance with applicable laws, policies, and regulations to meet specific objectives.

Presuppression
Activities in advance of fire occurrence to ensure effective suppression action. Includes planning the organization, recruiting and training, procuring equipment and supplies, maintaining fire

equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.

Prevention

1 Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards (fuels management).

2 Actions to avoid an incident, to intervene for the purpose of stopping an incident from occurring, or to mitigate an incident's effect to protect life and property. Includes measures designed to mitigate damage by reducing or eliminating risks to persons or property, lessening the potential effects or consequences of an incident.

Rate of Spread

The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Red Flag Warning

Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation

Efforts undertaken within three years of a wildland fire to repair or improve fire damaged lands unlikely to recover to a management approved conditions or to repair or replace minor facilities damaged by fire.

Restoration

The continuation of rehabilitation beyond the initial three years or the repair or replacement of major facilities damaged by the fire.

Rural Fire District (RFD)

An organization established to provide fire protection to a designated geographic area outside of areas under municipal fire protection. Usually has some taxing authority and officials may be appointed or elected.

Rural Fire Protection

Fire protection and firefighting problems that are outside of areas under municipal fire prevention and building regulations and that are usually remote from public water supplies.

Situational Awareness (SA)

An on-going process of gathering information by observation and by communication with others. This information is integrated to create an individual's perception of a given situation.

Size Class of Fire
As to size of wildfire:
Class A - one-fourth acre or less;
Class B - more than one-fourth acre, but less than 10 acres;
Class C - 10 acres or more, but less than 100 acres;
Class D - 100 acres or more, but less than 300 acres;
Class E - 300 acres or more, but less than 1,000 acres;
Class F - 1,000 acres or more, but less than 5,000 acres;
Class G - 5,000 acres or more.

Smokejumper
A specifically trained and certified firefighter who travels to wildland fires by aircraft and parachutes to the fire.

Spot Fire
Fire ignited outside the perimeter of the main fire by a firebrand.

Spot Weather Forecast
A special forecast issued to fit the time, topography, and weather of a specific incident. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts. Usually, on-site weather observations or a close, representative observation is required for a forecast to be issued.

Strategy
The general plan or direction selected to accomplish incident objectives.

Suppression
Management action to extinguish a fire or confine fire spread beginning with its discovery.

Tactics
Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Uncontrolled Fire
Any fire which threatens to destroy life, property, or natural resources, and (a) is not burning within the confines of firebreaks, or (b) is burning with such intensity that it could not be readily extinguished with ordinary tools commonly available.

Wildland Fire
Any non-structure fire that occurs in vegetation or natural fuels. Wildland fire includes prescribed fire and wildfire.

Wildland Urban Interface (WUI)
The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.

Appendix 2. BLM Best Management Practices for Fire Operations and Fuels Management.

A. Fire Operations Best Management Practices for Sage-Grouse Conservation

1. Compile district-level information into statewide sage-grouse toolboxes. Toolboxes will contain maps, listing of resource advisors, contact information, local guidance, and other relevant information for each district, which will be aggregated into a statewide document.

2. Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.

3. Assign a resource advisor with sage-grouse expertise, or who has access to sage-grouse expertise, to all extended attack fires in or near sage-grouse habitat areas. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals.

4. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.

5. As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines in order to minimize fire spread.

6. During periods of multiple fires, ensure line officers are involved in setting priorities.

7. To the extent possible, locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, heli-bases, etc.) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.

8. Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATV) prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread.

9. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.

10. Minimize burnout operations in key sage-grouse habitat areas by constructing direct fireline whenever safe and practical to do so.

11. Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack.

12. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.

13. Adequately document fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

B. Fuels Management Best Management Practices for Sage-Grouse Conservation

1. Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which most benefit sage-grouse habitat.

2. Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.

3. Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion).

4. Ensure proposed sagebrush treatments are planned with full interdisciplinary input pursuant to NEPA and coordination with state fish and wildlife agencies, and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.

5. Where appropriate, ensure that treatments are configured in a manner that promotes use by sage-grouse.

6. Where applicable, incorporate roads and natural fuel breaks into fuel break design.

7. Power-wash all vehicles and equipment involved in fuels management activities, prior to entering the area, to minimize the introduction of undesirable and/or invasive plant species.

8. Design vegetation treatments in areas of high fire frequency which facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat. Additionally, develop maps for sage-grouse habitat that spatially display current fuels treatment opportunities for suppression resources.

9. Give priority for implementing specific sage-grouse habitat restoration projects in annual grasslands, first to sites which are adjacent to or surrounded by preliminary priority habitat (PPH) or that reestablish continuity between priority habitats. Annual grasslands are a second priority for restoration when the sites are not adjacent to PPH, but within two miles of PPH. The third priority for annual grassland habitat restoration projects are sites beyond two miles of PPH. The intent is to focus restoration outward from existing, intact habitat.

10. As funding and logistics permit, restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs or one of that referenced in land use planning documentation.

11. Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.

12. Remove standing and encroaching trees within at least 100 meters of occupied sage-grouse leks and other habitats (e.g., nesting, wintering and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit.

13. Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.

14. Reduce the risk of vehicle- or human-caused wildfires and the spread of invasive species by planting perennial vegetation (e.g., green-strips) paralleling road rights-of-way.

15. Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, etc.) to aid in controlling wildfire, should wildfire occur near PPH or important restoration areas (such as where investments in restoration have already been made).

RANGELAND FIRE PROTECTION ASSOCIATION FORMATION CHECKLIST

Landowner agreement on fire protection needs

Local contacts requesting support of formation (recommended)

- County Commissioners
- County Sheriff
- County Emergency Coordinator
- Local State Senators and Representatives

Landowner Organization

- Board of Directors
- Chairperson
- Secretary/Treasurer
- Articles of Incorporation or Association
- By-laws
- Boundaries of Association
  - Map (work with IDL)
- Submit Articles (www.sos.idaho.gov)
- Obtain 501(c)(3) tax-exempt status (www.irs.gov/charities)
- Membership
  - Schedule Training
  - Order Personal Protective Equipment (PPE) and Radios through IDL
- Liability Insurance
- Agreement with IDL
- Memorandum of Understanding with BLM and/or USFS
- Mutual Aid Agreements/MOUs with adjacent Departments/Districts
- County Wildfire Protection Plan, through County Emergency Coordinator

Organizational Finance

- Annual budget
- Revenue process
- Insurance

Grants

- Idaho Department of Lands/USFS Volunteer Fire Assistance (VFA)
  www.idl.idaho.gov/nat_fire_plan/nfp-grants/nfp-grants.html
- Assistance to Fire Fighters Grant
  www.fema.gov/welcome-assistance-firefighters-grant-program
- Idaho Fire Chiefs Association Fire Fighter License Plate Fund
  www.idahofirechiefs.org
- Idaho Bureau of Homeland Security
- Local private business or foundation grants

Equipment

- Federal Excess Personal Property (FEPP)
- FEPP Handbook
- Maintenance
- Storage
- Licensing

Appendix 7. Total acreage of PPH and PGH burned in 2012 wildfires on all lands. "Percent burned" column is the proportion of PGH or PPH burned during the year (source: BLM Fire Planning and Fuels Management Division).

National Totals*			
All States	Acres of:	Acres Burned in:	Percent Burned:
PGH	74,782,478	904,049	1.209%
PPH	68,359,525	1,799,138	2.632%
CA	Acres of:	Acres Burned in:	Percent Burned:
PGH	200,503	0	0.000%
PPH	1,129,159	258,464	22.890%
CO	Acres of:	Acres Burned in:	Percent Burned:
PGH	1,486,984	2,064	0.139%
PPH	2,366,262	2,696	0.114%
ID	Acres of:	Acres Burned in:	Percent burned:
PGH	4,518,018	182,679	4.043%
PPH	10,486,107	342,258	3.264%
MT	Acres of:	Acres Burned in:	Percent burned:
PGH	24,965,911	232,520	0.931%
PPH	9,025,071	42,666	0.473%
NV	Acres of:	Acres Burned in:	Percent burned:
PGH	5,850,001	61,733	1.055%
PPH	14,671,966	381,727	2.602%
ND	Acres of:	Acres Burned in:	Percent burned:
PGH	243,471	0	0.000%
PPH	460,167	0	0.000%
OR	Acres of:	Acres Burned in:	Percent burned:
PGH	8,250,034	324,056	3.928%
PPH	6,566,282	693,565	10.563%
SD	Acres of:	Acres Burned in:	Percent burned:
PGH	1,534,564	0	0.000%
PPH	621,607	12	0.002%
UT	Acres of:	Acres Burned in:	Percent burned:
PGH	0	0	0.000%
PPH	7,237,798	37,990	0.525%
WY	Acres of:	Acres Burned in:	Percent burned:
PGH	27,732,993	100,997	0.364%
PPH	15,795,105	39,759	0.252%

Appendix 8. Total acreage of PPH and PGH burned in 2013 wildfires on all lands. "Percent burned" column is the proportion of PGH or PPH burned during the year (source: BLM Fire Planning and Fuels Management Division).

National Totals			
All States	Acres of:	Acres Burned in:	Percent Burned:
PGH	74,793,731	255,601	0.342%
PPH	68,357,707	146,920	0.215%
NOTE: "Acres burned in" equals a cumulative total for 2013			
CA	Acres of:	Acres Burned in:	Percent Burned:
PGH	200,419	0	0.000%
PPH	1,129,404	0	0.000%
CO	Acres of:	Acres Burned in:	Percent Burned:
PGH	1,486,891	540	0.036%
PPH	2,366,262	692	0.029%
ID	Acres of:	Acres Burned in:	Percent Burned:
PGH	4,518,813	151,545	3.354%
PPH	10,485,312	76,615	0.731%
MT	Acres of:	Acres Burned in:	Percent burned:
PGH	24,965,911	1,571	0.006%
PPH	9,025,071	17	0.000%
NV	Acres of:	Acres Burned in:	Percent burned:
PGH	5,850,233	5,745	0.098%
PPH	14,671,966	22,652	0.154%
OR	Acres of:	Acres Burned in:	Percent burned:
PGH	8,250,034	94,010	1.140%
PPH	6,566,282	27,524	0.419%
UT	Acres of:	Acres Burned in:	Percent burned:
PGH	0	0	0.000%
PPH	7,237,798	19,210	0.265%
WY	Acres of:	Acres Burned in:	Percent burned:
PGH	27,733,087	2,190	0.008%
PPH	15,795,105	210	0.001%

Appendix 9. Total acreage of PPH and PGH burned in 2014 wildfires on all lands. "Percent burned" column is the proportion of PGH or PPH burned during the year (source: BLM Fire Planning and Fuels Management Division)

National Totals			
ALL States	Acres of:	Acres Burned in:	Percent Burned:
PGH	74,793,731	305,663	0.409%
PPH	68,357,707	258,310	0.378%
NOTE: "Acres burned in" equals a cumulative			
CA	Acres of:	Acres Burned in:	Percent Burned:
PGH	200,484	0	0.000%
PPH	1,129,178	0	0.000%
CO	Acres of:	Acres Burned in:	Percent Burned:
PGH	1,486,891	262	0.018%
PPH	2,366,262	21,000	0.887%
ID	Acres of:	Acres Burned in:	Percent Burned:
PGH	4,518,813	3,280	0.073%
PPH	10,485,312	33,996	0.324%
MT	Acres of:	Acres Burned in:	Percent Burned:
PGH	24,965,911	3,787	0.015%
PPH	9,025,071	8,442	0.094%
NV	Acres of:	Acres Burned in:	Percent Burned:
PGH	5,850,233	5,160	0.088%
PPH	14,671,966	15,288	0.104%
OR	Acres of:	Acres Burned in:	Percent Burned:
PGH	8,250,034	292,879	3.550%
PPH	6,566,282	168,666	2.569%
UT	Acres of:	Acres Burned in:	Percent Burned:
PGH	0	0	0.000%
PPH	7,237,798	7,298	0.101%
WA	Acres of:	Acres Burned in:	Percent Burned:
PGH	0	0	0.000%
PPH	1,277,919	3,320	0.260%
WY	Acres of:	Acres Burned in:	Percent Burned:
GH	27,733,087	295	0.001%
PPH	15,795,105	300	0.002%

Sarah Crump

From: Mermejo, Lauren <lmermejo@blm.gov>
Sent: Tuesday, September 29, 2015 6:06 PM
To: nvca sagegrouse
Subject: Fwd: Secretarial Order and Great Basin LCC Project Portfolio
Attachments: Secretarial Order 3336.pdf; Great Basin LCC Science Project Portfolio.pdf

---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Wed, Jan 7, 2015 at 11:06 AM
Subject: Secretarial Order and Great Basin LCC Project Portfolio
To: Joan Suther <jsuther@blm.gov>, Jessica Rubado <jarubado@blm.gov>, jmbeck@blm.gov, Brent Ralston <bralston@blm.gov>, Quincy Bahr <qfbahr@blm.gov>, "Melvin (Joe) Tague" <jtague@blm.gov>
Cc: Matthew Magaletti <mmagalet@blm.gov>, David Batts <david.batts@empsi.com>, Glen Stein <gstein@fs.fed.us>

Hi All –

By now, I assume that you have all seen the new Secretarial Order with focused goals on reducing the size, severity, and cost of rangeland fires; addressing the spread of cheatgrass and other invasive species; and positioning wildland fire management resources for more effective rangeland fire response.

But…..I don't think you have seen the Great Basin LCC Science Project Portfolio……its very interesting and I would encourage all of you to take a look at all of the great science projects that the LCC is coordinating for the Great Basin.

Lauren

--
Lauren L. Mermejo
Great Basin Greater Sage-Grouse Project Mgr.
BLM, Nevada State Office
775 861-6580

March 3, 1849

THE SECRETARY OF THE INTERIOR
WASHINGTON

ORDER NO. 3336

Subject: Rangeland Fire Prevention, Management and Restoration

Sec. 1 **Purpose**. This Order sets forth enhanced policies and strategies for preventing and suppressing rangeland fire and for restoring sagebrush landscapes impacted by fire across the West. These actions are essential for conserving habitat for the Greater sage-grouse as well as other wildlife species and economic activity, such as ranching and recreation, associated with the sagebrush-steppe ecosystem in the Great Basin region. This effort will build upon the experience and success of addressing rangeland fire, and broader wildland fire prevention, suppression and restoration efforts to date, including the National Cohesive Wildland Fire Management Strategy, and ensure improved coordination with local, state, tribal, and regional efforts to address the threat of rangeland fire at a landscape-level.

Sec. 2 **Background**. The Department of the Interior is entrusted with overseeing the management of Federal lands for the benefit of current and future generations as well as the protection and recovery of imperiled species of flora and fauna and the ecosystems upon which they depend. Rangeland fires in the Great Basin of the Western United States have increased in size and intensity in recent years. The accelerated invasion of non-native annual grasses, in particular cheatgrass and medusahead rye, and the spread of pinyon-juniper across the sagebrush-steppe ecosystem, along with drought and the effects of climate change, have created conditions that have led to the increased threat of rangeland fires to the sagebrush landscape and the more than 350 species of plants and animals, such as mule deer and pronghorn antelope, that rely on this critically important ecosystem. As a result, the increasing frequency and intensity of rangeland fire also poses a significant threat to ranchers, livestock managers, sportsmen, and outdoor recreation enthusiasts who use the sagebrush-steppe ecosystem, and puts at risk their associated economic contributions across this landscape that support and maintain the American way of life in the West.

In 2010, the U.S. Fish and Wildlife Service (USFWS) found that the invasion of annual grasses and the loss of habitat from fire in the Great Basin is a significant threat to the Greater sage-grouse in that portion of its remaining range. The USFWS is now considering whether protections under the Endangered Species Act are warranted. In response to this finding, the Bureau of Land Management (BLM) and the U.S. Forest Service are currently undertaking land use plan revisions and amendments to incorporate appropriate conservation measures to conserve, enhance, and restore Greater sage-grouse habitat by reducing, eliminating, or minimizing threats to that habitat. More targeted actions to reduce the likelihood and severity of fire, to stem the spread of invasive species, and to restore the health and resilience of the landscape are necessary to preserve, protect, and restore Greater sage-grouse habitat in the sagebrush-steppe ecosystem, and address important public safety, economic, cultural, and social concerns. This includes enhanced coordination and collaboration with partners and stakeholders, including rangeland fire protection associations.

Sec. 3 **Authorities**. This Order is issued under the authority of Section 2 of Reorganization Plan No. 3 of 1950 (64 Stat.1262), as amended. Other statutory authorities related to this Order include and are not limited to the following:

a. National Environmental Policy Act (NEPA), 42 U.S.C. 4321 *et seq.*

b. The Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*

c. The Migratory Bird Conservation Act, 16 U.S.C. 715 *et seq.*

d. The National Fish and Wildlife Foundation Establishment Act, 16 U.S.C. 3701 *et seq.*

e. The Fish and Wildlife Coordination Act, 16 U.S.C. 661 *et seq.*

f. The Federal Land and Policy Management Act (FLPMA), 43 U.S.C. 1701 *et seq.*

g. The Federal Land Assistance Management and Enhancement Act of 2009, Title V of Division A of P.L. 111-88.

Sec. 4 **Policy**. Protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, Greater sage-grouse habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department. Allocation of fire management resources and assets before, during, and after wildland fire incidents will reflect this priority, as will investments related to restoration activities.

Sec. 5 **Developing an Enhanced Fire Prevention, Suppression, and Restoration Strategy**. To accomplish protection, conservation, and restoration of Greater sage-grouse habitat the Department, through the Rangeland Fire Task Force established in accordance with Section 6, will:

a. Work cooperatively and collaboratively with other Federal agencies, states, tribes, local stakeholders, and non-governmental organizations on fire management and habitat restoration activities, including: (i) Enhancing the capability and capacity of state, tribal, and local government, as well as non-governmental, fire management organizations, including rangeland fire protection associations and volunteer fire departments, through improved and expanded education and training; and (ii) Improving coordination among all partners involved in rangeland fire management to further improve safety and effectiveness.

b. Utilize risk-based, landscape-scale approaches to identify and facilitate investments in fuels treatments, fire suppression capabilities, and post-fire stabilization, rehabilitation, and restoration in the Great Basin.

c. Seek to reduce the likelihood, size, and severity of rangeland fires by addressing the spread of cheatgrass and other invasive, non-native species.

d. Commit wildland fire management resources and assets to prepare for and respond to rangeland fires.

e. Advance the development and utilization of technologies for identifying areas of high ecological and habitat value in sagebrush-steppe ecosystems to enhance fire prevention and sage-grouse habitat protection efforts.

f. Apply science and research to improve the identification and protection of resistant and resilient sagebrush-steppe landscapes and the development of biocontrols and other tools for cheatgrass control to improve capability for long-term restoration of sagebrush-steppe ecosystems.

g. To the extent practicable, utilize locally-adapted seeds and native plant materials appropriate to the location, conditions, and management objectives for vegetation management and restoration activities, including strategic sourcing for acquiring, storing, and utilizing genetically-appropriate seeds and other plant materials native to the sagebrush-steppe ecosystem.

h. Encourage efforts to expedite processes, streamline procedures, and promote innovations that can improve overall rangeland fire prevention, suppression and restoration efficiency and effectiveness.

i. Explore opportunities to pilot new strategies to reduce the threat of invasive, non-native plant species and rangeland fire to sagebrush-steppe ecosystems and Greater sage-grouse conservation, including enhanced use of veteran fire crews and youth conservation teams, and efforts to further public-private partnerships to expand capacity for improved fire management.

j. Establish protocols for monitoring the effectiveness of fuels management, post-fire, and long-term restoration treatments and a strategy for adaptive management to modify management practices or improve land treatments when necessary.

Sec. 6 **Rangeland Fire Task Force**. A Rangeland Fire Task Force (Task Force) is hereby established and is chaired by the Deputy Secretary. Members of the Task Force shall include: Assistant Secretary – Policy, Management and Budget, Assistant Secretary – Land and Minerals Management, Assistant Secretary for Fish and Wildlife and Parks, Assistant Secretary – Water and Science, and Assistant Secretary – Indian Affairs. The Task Force will do the following:

a. Develop a science-based strategy to reduce the threat of large-scale rangeland fire to habitat for the Greater sage-grouse and the sagebrush-steppe ecosystem through effective rangeland management (including the appropriate use of livestock), fire prevention, fire suppression, and post-fire restoration efforts at a landscape scale.

b. Conduct a comprehensive review of the existing programs, policies, and practices associated with current efforts to prevent, suppress, and restore rangeland fire-impacted sagebrush-steppe, including the outcomes of the recent rangeland fire conference *The Next Steppe: Sage-grouse and Rangeland Fire in the Great Basin*, and utilize the experience of the conference participants; and the expertise of the practitioners and senior policy groups in this effort.

c. Seek input from the U.S. Geological Survey and individual Bureau Fire Directors in the Department; the U.S. Forest Service and the Natural Resources Conservation Service in the

Department of Agriculture; various state wildland fire agencies and programs; the offices of the governors in the states most threatened by rangeland fire, including California, Oregon, Nevada, Utah, and Idaho, as well as the Western Governors' Association; affected American Indian tribes; scientists; and local, community-based fire organizations such as the rangeland fire protection associations, weed collaboratives, native seed production organizations, soil and water conservation districts, and various stakeholder groups with interest and expertise in rangeland fire prevention, suppression, and rangeland restoration.

Sec. 7 **Implementation Plan, Deliverables and Report**.

a. No later than February 1, 2015, the Task Force will provide a detailed plan for implementing this Order that includes a process for tribal consultation.

b. The Task Force will provide to the Secretary two reports that outline actions that can be accomplished prior to the onset of the 2015 Western fire season, actions that can be accomplished prior to the onset of the 2016 Western fire season, and actions that will require a longer period for implementation. At a minimum, these actions are to include the following:
(i) Design and implement comprehensive, integrated fire response plans for the Fire and Invasives Assessment Tool evaluation areas in the Great Basin subject to fire and invasive species;
(ii) Provide clear direction on the prioritization and allocation of fire management resources and assets; (iii) Expand the focus on fuels reduction opportunities and implementation; (iv) Fully integrate the emerging science of ecological resilience into design of habitat management, fuels management, and restoration projects; (v) Review and update emergency stabilization and burned area rehabilitation policies and programs to integrate with long-term restoration activities;
(vi) Commit to multi-year investments for the restoration of sagebrush-steppe ecosystems, including consistent long-term monitoring protocols and adaptive management for restored areas;
(vii) Implement large-scale experimental activities to remove cheatgrass and other invasive annual grasses through various tools; (viii) Commit to multi-year investments in science and research; and
(ix) Develop a comprehensive strategy for acquisition, storage, and distribution of seeds and other plant materials.

c. No later than March 1, 2015, the Task Force will present its initial report on actions that will be implemented prior to the 2015 Western fire season. Individual bureaus are also encouraged to take immediate action to implement improvements within their respective areas of responsibility before the initial report is issued.

d. No later than May 1, 2015, the Task Force will present its final report on activities that will be implemented prior to the 2016 Western fire season, and longer term actions to implement the policy and strategy set forth in this Order, including to ensure continued implementation of approved actions associated with the strategy.

Sec. 8 **Implementation**. The Deputy Secretary is responsible for implementing all aspects of this Order. This responsibility may be delegated as appropriate. This Order does not alter or affect any existing duty or authority of individual Assistant Secretaries or bureaus.

Sec. 9 **Effect of the Order**. This Order is intended to improve the internal management of the

Department. This Order and any resulting report or recommendations are not intended to, and do not, create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its departments, agencies, instrumentalities or entities, its officers or employees, or any other person. To the extent there is any inconsistency between the provisions of this Order and any Federal laws or regulations, the laws or regulations will control.

Sec. 10 **Expiration Date**. This Order is effective immediately. It will remain in effect until its provisions are converted to the Departmental Manual, or until it is amended, superseded or revoked, whichever occurs first.

Sally Jewell

Secretary of the Interior

Date: JAN 5 2015

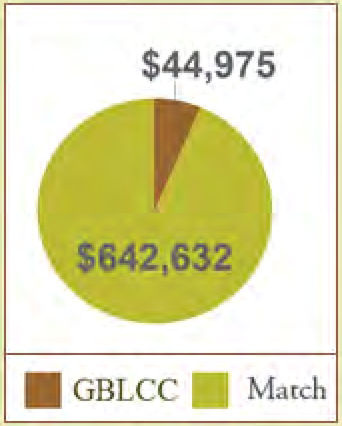
Characterization of montane ecosystems, their microclimates, and wildlife distribution and abundance across the hydrographic Great Basin

This project retrieves four years of data from over 200 temperature sensors nested within 28 sites across ~40 million hectares of the hydrographic Great Basin. The sensors span all major aspects and up to 700 m of elevation within sites, and occur in numerous management jurisdictions in 18 mountain ranges plus other areas not in ranges.


Photo courtesy of Thomas P. Albright

This project:

- Quantifies the variability of climate at micro-, meso-, and macroscales across the Basin, and across diel, seasonal, and interannual periods.
- Informs management and conservation efforts, in terms of helping calibrate and refine the climatic 'stage' upon which all biological 'actors' and efforts hinge (Beier and Brost 2010).
- Feeds into other bioclimatic and wildlife studies seeking to describe climate and biotic responses to it.



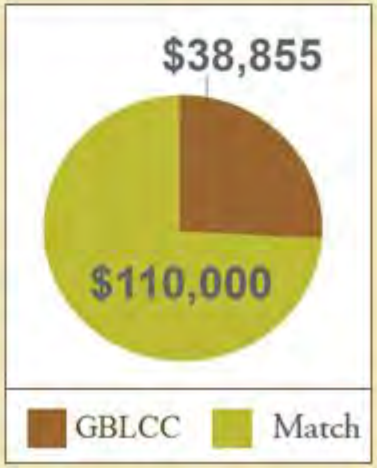
2013

Dr. Erik Beever, US Geological Survey, NOROCK Science Center

Effects of genotype and management treatments of native and invasive herbs on success of sagebrush restoration

The increase in large wildfires at a time when habitat for Greater Sage Grouse and other species dependent on big sagebrush has also increased has led to substantial needs for big sagebrush seeds. Significant decisions on which sagebrush seed to use and on management treatments that affect competing herb layers on the same restoration sites affect the trajectory of habitat.

This project evaluates how seed source, specifically genotype and climate-of-origin, interact with landscape-scale and replicated treatments (fencing, herbicide application, mowing, and seeding).



2013

Dr. Matt Germino, US Geological Survey

Understanding the causes and consequences of cheatgrass die-offs in the Great Basin

Cheatgrass die-offs are unexplained instances of stand failure observed in areas of Nevada and Utah, where cheatgrass fails to grow even though it has been a dominant component of plant communities in the past.

This project:

- Provides information on the size and extent of historic (1985 – 2012) die-offs in the Winnemucca area using satellite imagery.
- Determines if die-offs are restoration opportunities by planting and monitoring local and commercially available native grasses in die-off areas.
- Develops predictive spatial models of die-off from analysis of satellite imagery and GIS models.

Photo courtesy of Elizabeth Leger

2013

Dr. Elizabeth Leger, University of Nevada, Reno

Development of tools and technology to improve the success and planning of restoration of big sagebrush ecosystems

Shrub-dominated ecosystems of the Great Basin are being threatened by disturbances, typically wildfire followed by encroachment of invasive plants (e.g., cheat grass). To mitigate these threats and future changes in the climate to big sagebrush (Artemisia tridentata), restorationists require a knowledge base and tools to inform them of the most appropriate seed sources to plant to greatly enhance the success of restoration under contemporary and future climates.

This project develops climate-responsive seed transfer zones based on associating plant quantitative traits and ecophysiological data from common gardens to the climate of the seed source.

2013

Dr. Bryce Richardson, USDA Forest Service, Rocky Mountain Research Station

Desatoya Mountains Project and the Porter Canyon Experimental Watershed

Piñon (Pinus spp.) and juniper (Juniperus spp.) (PJ) currently occupy approximately 19 million hectars in the Intermountain West. Prior to 1860, approximately 66% of what is now woodland occurred as sagebrush plant communities.

This watershed scale project:

- Documents the impact of PJ treatments in formerly sagebrush steppe communities on understory vegetation composition, hydrologic function, and surface runoff and soil erosion at the landscape scale.
- Expands the snow monitoring component to understand snow dynamics and timing of plant phenology in cut and uncut treatments
- Secures expertise to analyze existing datasets.

2013

Dr. Keirith Snyder, USDA Forest Service, Agricultural Research Station

Evaluating Species Management Guidance and Monitoring Programs for the Great Basin in Nevada

The project builds on recent, well-researched species conservation plans for Nevada (GBBO 2010, NWPT 2012) and research on scientifically based disturbance buffer recommendations to evaluate GBBO's statewide landbird monitoring program, the Nevada Bird Count.

This project will create an online open-source compendium document that will provide a scientific review of:

- Current priority species management practices in Nevada
- Status of our combined scientific knowledge of priority species' needs and gaps in that knowledge
- Adequacy of current monitoring programs of priority species.

2013

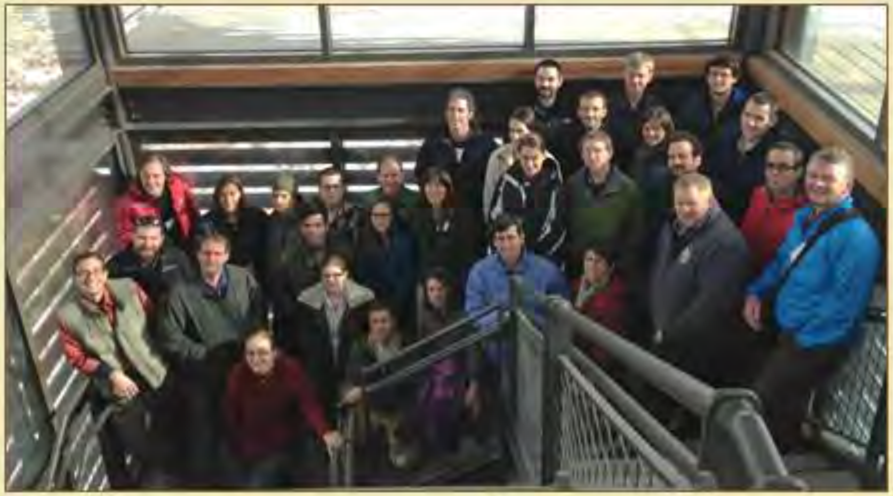
Dr. Elisabeth Ammon, Great Basin Bird Observatory

Forecasting changes in sagebrush distribution and abundance under climate change: integration of spatial, temporal, and mechanistic models

The goal of this project is to forecast the effect of climate change on the distribution and abundance of big sagebrush in order to inform conservation planning, and sage grouse management in particular, across the Intermountain West. The novelty of the work will be the synthesis of models based on spatial, temporal, and mechanistic relationships between climate and sagebrush cover.

The project will:

- Culminate in a working group meeting, bringing together land managers and researchers to draft management recommendations.
- Take advantage of mechanisms already in place to efficiently disseminate this report to management agencies.



2014

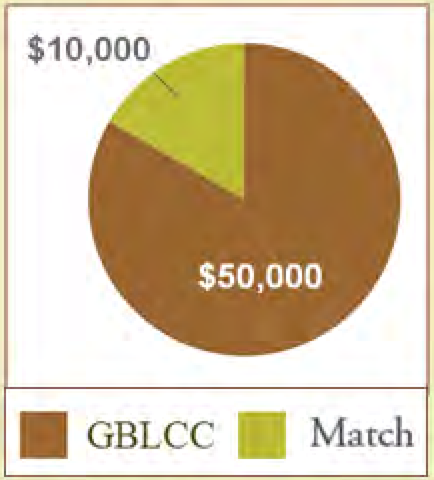
Dr. Peter Adler, Utah State University

Walker River Paiute Tribe TEK project

The Walker River Paiute Tribe has vast Traditional Ecological Knowledge (TEK) of the local area relating to plants, wildlife, fish and water. Due to the rapid rate of climate change and the impacts it has had on the reservation and gathering areas, the Tribe has not been able to keep up with the changes.

To address these challenges, the project team will:

- ➢ Develop a Walker River Vision document which will include TEK of the traditional plants, wildlife, fish and water located on the reservation and traditional hunting/ gathering areas of the Agai Dicutta Numa (Walker River Paiutes) for use in future resource management planning and cultural sustainability.
- ➢ Develop a pilot project along the Walker River on the reservation by planting willows and other traditional plants to determine best practices for re-vegetation.



2014

Marlene Begay, Walker Rive Paiute Tribe

Landscape connectivity of a sagebrush obligate: functional continuity of habitat for the pygmy rabbit

This project quantifies functional landscape connectivity of the pygmy rabbit, a sensitive, sagebrush ecosystem obligate, through integration of landscape genomic data with statistical modeling of habitat quality and connectedness.

The project team will:

- Use models to forecast the distribution and landscape connectivity of this species under various climate change scenarios.
- identify those critical areas with greatest potential to facilitate distributional shifts in response to climate change.
- Further refine the predictive capabilities of these models.

2014

Dr. Marjorie Matocq, University of Nevada Reno

Cheatgrass Stand Failure in the Great Basin: Fungal Pathogens, Carbon Dynamics, and Fungistasis

This project proposes to test the hypothesis that soil fungistasis (suppression of fungal pathogens by soil microbes in carbohydrate-limited soil) and its alleviation through natural carbohydrate augmentation (e.g., cheatgrass litter, leakage from cheatgrass roots) are the principal processes mediating patterns of cheatgrass die-off and recovery in die-off-prone areas.

The project team will use laboratory, greenhouse, and field manipulative experiments to examine the effect of soil carbohydrates on cheatgrass disease incidence.

2014

Dr. Susan Meyer, USFS Rocky Mountain Research Station

Understanding Native cultural dimensions of climate change in the Great Basin

Tribes are disproportionately affected by climate change because their economies, traditions, and even identity are heavily reliant on place-based natural resources. Changes in these resources may result in associated shifts and adaptations in tribal cultural traditions. Observations by tribal elders should lead to better understanding of how the nuances and dimensions of tribal culture in the Great Basin are affected by climate change, what contributes to vulnerability to a changing climate, and the adaptive capacity of these communities to ecological shifts.

To address these challenges, the project team will:

- Explore tribal cultural relationships and practices connected to resources and other aspects of nature that are potentially affected by climate change.
- Interview elders with two tribes in the Great Basin in order to learn how a changing environment has affected aspects of tribal culture.

2014

Dr. Phillip Mote, Oregon State University

Using soil climate and geospatial environmental characteristics to determine plant community resilience to fire and fire surrogate treatments

This project associates site-measured soil climate and other soil variables, and geospatially-derived site environmental characteristics with perennial herbaceous and cheatgrass cover in treated and untreated Great Basin wooded shrublands.

The project team will:

- Use vegetation and soil data already collected in SageSTEP and tree shredding studies.
- Develop models to indicate potential vegetation response to tree reduction treatments both for current and projected climate conditions for a wide range of sites.
- Develop ranges of key attributes associated with less to more resilient sites.
- Publish a guide on the SageSTEP website on how to use our models and findings as decision support tools.

2014

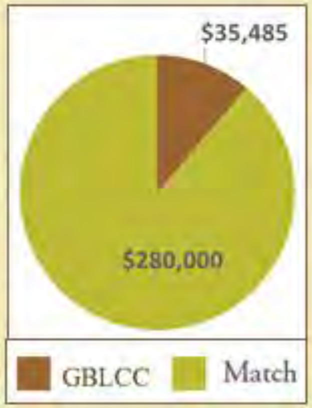
Dr. Bruce Roundy, Brigham Young University

Assessment of Impacts of Feral Horses and Livestock Grazing on Sage-grouse and their Habitats: Long-term trends in sage-grouse demography and habitats on the Sheldon-Hart Mountain National Wildlife Refuge Complex and adjacent lands

This project takes advantage of historical patterns of grazing by both feral horses and livestock and new data to assess sage-grouse population dynamics and habitats under all combinations of grazing by nonnative ungulates.

The project team will:

- Use historical sage-grouse data collected from Hart Mountain before and immediately after livestock were removed in the early 1990s, and historical data from Sheldon before the irruption of feral horses in the mid 2000s.
- Add data from Hart Mountain (no nonnative ungulates for 20 years), Sheldon (no livestock but substantial feral horse impacts), and BLM land south of Sheldon NWR (grazed by both feral horses and livestock).



2014

Dr. James Sedinger - University of Nevada Reno

Using Narrative Stories to Understand Traditional Ecological Knowledge in the Great Basin

This pilot project uses a method of naïve interviewing with tribal youths to gather narrative "micro stories" from elders and key tribal members and then answering a series of carefully constructed questions that allow participants to apply context and meaning to their stories. These questions can then be analyzed quantitatively using correlational statistics to identify key themes and patterns across the narrative dataset.

This approach has several advantages including:

- ➢ It uses tribal members to gather the data.
- ➢ It provides a link between the generations to raise awareness about environmental concerns and TEK.

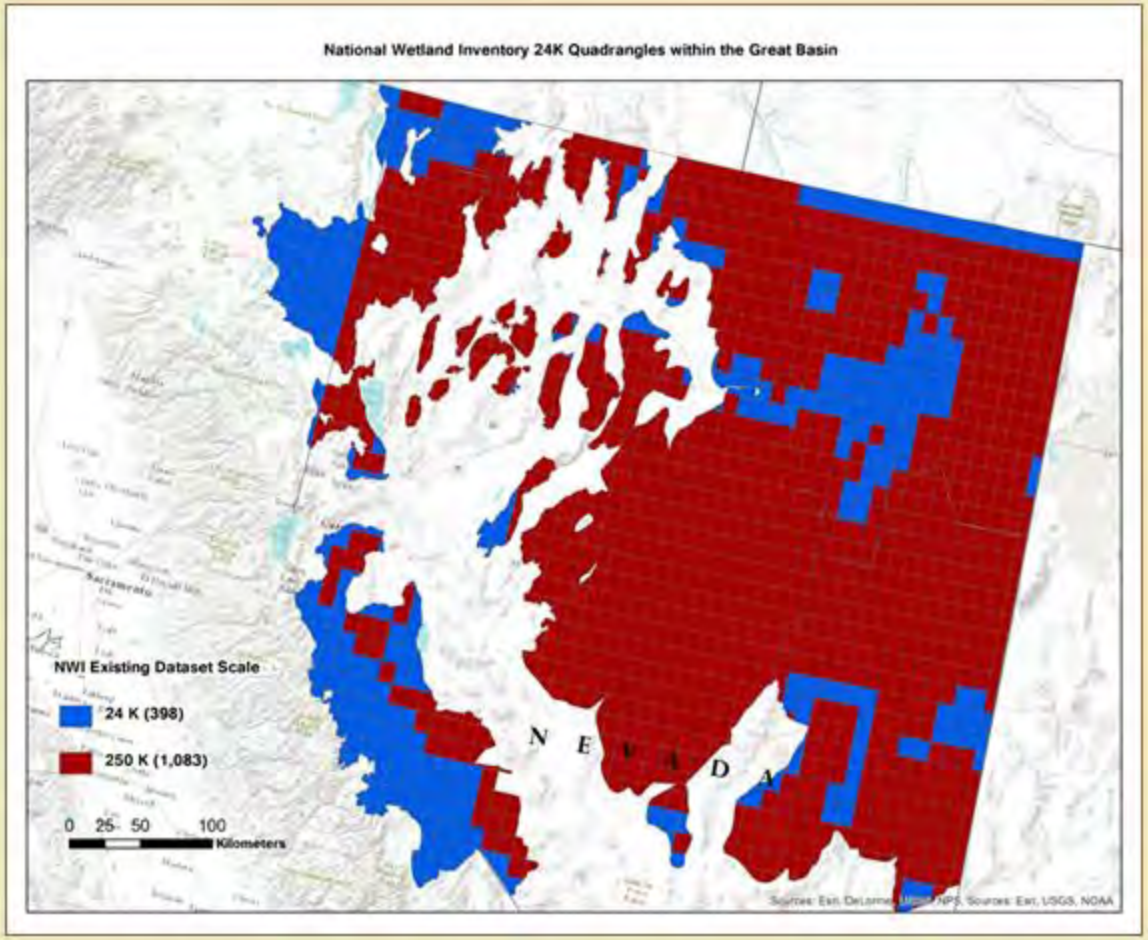
2014

Dr. Tamara Wall,
The Board of Regents of the Nevada system of Higher Education

Strategic High-resolution Wetland Mapping in Sage-grouse Biologically Significant Areas of Nevada

This effort is a direct result of the GB LCC led Central Basin & Range Rapid Ecoregional Assessment Challenges and Opportunities Report (draft), which identified a paucity of available wetland and springs data layers for the CBR REA area.

This project will provide wetland mapping at high resolution (1:24,000) for 13 Million acres of sage-grouse Biologically Significant Areas (BSAs) within Nevada.


National Wetland Inventory 24K Quadrangles within the Great Basin

Sources: Esri, DeLorme, NPS, Sources: Esri, USGS, NOAA

$ 320,000 GBLCC

Target of Opportunity

Elaine Blok, National Wetlands Inventory

Assessment and Inventory of the Great Basin Climatological Monitoring Stations for Climate Adaptation

Almost any map showing weather and climate stations for the United States shows a conspicuous lack of data in the Great Basin compared to surrounding states in all directions.

This project will:

- Create an assessment summarizing the state of climate monitoring
- Identify both areas where observation coverage is acceptable and where there are gaps in monitoring based on present future climates.

Outcomes from this effort will be incorporated into the scenarios for climate change assessment in the Great Basin (SP2 above).

$ 75,000 GBLCC

Target of Opportunity

Dr. Kelly Redmond, Western Regional Climate Center

Great Basin Springs Geospatial Database

This project builds upon the springs and seeps inventory funded by the Desert LCC.

This project will:

- Fill a significant gap in aquatic habitat information for scenario planning.
- Create a publically available geospatial database of approximately 2,000+ known Great Basin springs.
- Create a summary report on the biotic and abiotic conditions of the known springs.

$ 67,700 GBLCC

Target of Opportunity

Dr. Don Sada, Desert Research Institute

Climate Change Adaptation Planning Training for Tribes

This project will conduct two, 3-day workshops on climate change adaptation planning for up to 44 tribal members from the Great Basin.

The trainings will:

- Provide participants with an introduction to the adaptation planning process.
- Deliver templates, resource lists and other material that the tribes can use in developing an adaptation plan.
- Target tribal environmental and natural resource professionals in the Great Basin region (maximum of 22 participants per training).
- Be a mix of presentations, small- and large-group discussions, a field trip and other activities.
- Be lead by staff from the Institute for Tribal Environmental Professionals, GBLCC, tribes, and other agencies or organizations.

$ 90,000 GBLCC

Target of Opportunity

Sue Wotkyns, Institute of Tribal Environmental Professionals

Environmental Management (2011) 47:468–481
DOI 10.1007/s00267-011-9629-0

#679

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09/17/2013

Shrub-Steppe Early Succession Following Juniper Cutting and Prescribed Fire

Jonathan D. Bates · Kirk W. Davies · Robert N. Sharp

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Abstract *Pinus-Juniperus* L. (Piñon-juniper) woodlands of the western United States have expanded in area nearly 10-fold since the late 1800's. *Juniperus occidentalis* ssp. *occidentalis* Hook. (western juniper) dominance in sagebrush steppe has several negative consequences, including reductions in herbaceous production and diversity, decreased wildlife habitat, and higher erosion and runoff potentials. Prescribed fire and mechanical tree removal are the main methods used to control *J. occidentalis* and restore sagebrush steppe. However, mature woodlands become difficult to prescribe burn because of the lack of understory fuels. We evaluated partial cutting of the woodlands (cutting 25–50% of the trees) to increase surface fuels, followed by prescribed fire treatments in late successional *J. occidentalis* woodlands of southwest Idaho to assess understory recovery. The study was conducted in two different plant associations and evaluated what percentage of the woodland required preparatory cutting to eliminate remaining *J. occidentalis* by prescribed fire, determined the impacts of fire to understory species, and examined early post-fire successional dynamics. The study demonstrated that late successional *J. occidentalis* woodlands can be burned after pre-cutting only a portion of the trees. Early succession in the cut-and-burn treatments were dominated by native annual and perennial forbs, in part due to high mortality of perennial bunchgrasses. By the third year after fire the number of establishing perennial grass seedlings indicated that both associations would achieve full herbaceous recovery. Cutting-prescribed fire combinations are an effective means for controlling encroaching late successional *J. occidentalis* and restoring herbaceous plant communities. However, land managers should recognize that there are potential problems associated with cutting-prescribed fire applications when invasive weeds are present.

Keywords *Bunchgrass* · *Cheatgrass* · *Juniperus occidentalis* · Mountain big sagebrush · Secondary succession · Western snowberry

Introduction

During the past century, woodlands in many areas of the world have undergone rapid and substantial modification as a result of land use demands, alteration of historic fire regimes, invasive species, herbivore impacts, and climate changes. Ecological concerns in several woodland environments involve their loss or degradation, with examples found in South America (Bucher and Huszar 1999; Fuentes and others 1989), Asia (Ciesla and others 1998; Ciesla 2002), Australia (Hobbs and Yates 2000), and Africa (Ciesla and others 1995; Zerihun and Backleus 1991). In these regions, efforts have been focused on restoration of woodland and savanna systems (Bucher and Huszar 1999; Ciesla and others 1998; Yates and Hobbs 1997; Zerihun and Backleus 1991). In North America, Australia, and South Africa, deciduous and coniferous woodlands have expanded into shrublands (Holmes and Cowling 1997; Miller and Rose 1995; Miller and Tausch 2001; Miller and others 2005) and grasslands (Ansley and others 2001;

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Archer 1994; Burrows and others 1990; Van Auken 2000), as well as altering savanna systems as tree densities increased (Peterson and others 2007). In these ecosystems, removing or reducing encroaching woodlands is a major focus of restoration efforts to maintain shrublands and grasslands.

Pinus-Juniperus L. (Piñon-juniper) woodlands of the western United States have expanded rapidly since settlement began in the late 1800's (Miller and Tausch 2001). *Juniperus occidentalis* ssp. *occidentalis* Hook. (western juniper) woodlands found in the northern Great Basin and Columbia Plateau and have increased from about 0.3 million ha to nearly 3.5 million ha during the past 130 years in eastern Oregon, southwestern Idaho, and along the northern border of California and Nevada (Miller and others 2000). The main cause of the expansion has been attributed to reductions in fire disturbance as a consequence of grazing induced fine fuel reduction and fire suppression (Burkhardt and Tisdale 1969; Miller and Rose 1995). Prior to Euro-American settlement, mean fire return intervals (MFRI) in sagebrush steppe, sufficient to prevent *J. occidentalis* woodland development, have been estimated at between10 and 50 years (Burkhardt and Tisdale 1976; Miller and Rose 1995; Miller and others 2005; Miller and Heyerdahl 2008; Wright and Bailey 1982).

Encroaching *J. occidentalis* woodlands have been categorized into three successional phases (Miller and others 2005). Phase 1 woodlands occur when shrubs and herbaceous species are the dominant vegetation component with few trees present. In Phase 2 woodlands, *J. occidentalis* co-dominates with shrub and herbaceous layers. Phase 3 woodlands occur when *J. occidentalis* is dominant and is the primary component influencing ecological processes. The negative impacts of *J. occidentalis* invasion include increased soil erosion (Buckhouse and Mattison 1980; Pierson and others 2007), loss of wildlife habitat (Noson and others 2006; Reinkensmeyer and others 2007; Schaefer and others 2003), and reduced plant community diversity and herbaceous productivity (Bates and others 2000; Bates and others 2005; Bates and others 2006; Miller and others 2000; Miller and others 2005).

Prescribed fire, tree cutting, and a combination of these treatments have been the main methods used to control *J. occidentalis* and restore sagebrush steppe, *Populus tremuloides*(quaking aspen) woodlands, and riparian communities (Miller and others 2005). Harvesting of *J. occidentalis* as a bio-fuel for energy production has largely been confined to northeastern California. Elsewhere, commercial use of cut trees has not been economically viable because of transportation costs, inadequate infrastructure, cheaper energy alternatives, and concerns of long-term supply availability.

Fire remains a viable management option for *J. occidentalis* control in woodlands that are in early (Phase 1) to mid successional (Phase 2) stages when sufficient and continuous surface (0–1 m) fuels are present (Miller and others 2005). In late successional (Phase 3) woodlands, surface fuels are typically not adequate to sustain fire and kill trees. Clear-cutting and either removing or retaining cut trees on the ground remains the most common practice for managing late successional woodlands. Cutting treatments using chainsaws and tractor mounted shears has been successful at recovery of shrub-steppe plant communities (Rose and Eddleman 1994; Bates and others 2005; Bates and others 2007a; Miller and others 2005). Cutting and prescribed fire combinations are relatively recent methods for treating Phase 2 and Phase 3 *J. occidentalis* woodlands and have been applied extensively in eastern Oregon and northern California the past decade. These methods entail cutting about 30% of the trees to increase surface fuel levels to carry fire and kill remaining trees (Bates and others 2005; Bates and others 2007b; Miller and others 2005).

We evaluated partial cutting and prescribed fire treatments in Phase 3 *J. occidentalis* woodlands. Two levels of preparatory *J. occidentalis* cutting followed by prescribed fall fire were evaluated. The objectives of the study were to: (1) assess what percentage of woodlands required preparatory cutting to eliminate remaining *J. occidentalis* trees by prescribed fire; (2) determine fire impacts to understory species; and (3) evaluate early post-fire successional dynamics. We hypothesized the fire portion of the treatment would severely impact herbaceous understory, particularly bunchgrasses, by causing high mortality. A previous study indicated that fall burning of *P. tremuloides* woodland after partial cutting (one-third of trees cut) of encroaching *J. occidentalis* (Phase 3 woodland) eliminated the majority of perennial bunchgrasses and suppressed perennial forbs (Bates and others 2007b). Based on successional models developed for post-fire *Pinus-Juniperus* woodlands (Barney and Frischknecht 1974), we hypothesized that early succession would be characterized by high cover and abundance of annual and perennial forbs, with the potential for invasive grasses to increase because *Bromus tectorum* L. (cheatgrass) and *Poa bulbosa* L. (bulbous bluegrass) were present.

Methods

Study Area

The study was near South Mountain, Idaho, about 115 km south-southwest of Boise. Two plant associations were selected for treatment and were designated as Columbiana and Needlegrass. The Columbiana association occurred on north facing aspects, and the Needlegrass association occurred on west and southwest facing aspects. The Columbiana association was characterized by *Artemisia tridentata* Nutt. spp. *vaseyana* (Rydb.) Beetle-*Symphoricarpus oreophilus* Gray/*Achnatherum nelsonii* (Scribn.) Barkworth-*Festuca idahoensis* Elmer (mountain big sagebrush-mountain snowberry/Columbia needlegrass-Idaho fescue) plant communities. The Needlegrass association was comprised of *Artemisia tridentata* spp. *vaseyana*/*Achnatherum lettermanii* (Vasey) Barkworth-*Pseudoroegenaria spicata* (Pursh) A. Löve (Mountain big sagebrush/Letterman's needlegrass-bluebunch wheatgrass) plant communities. Both are representative of plant associations found between 1,525 and 1,800 m that are being invaded by western juniper in southwest Idaho. Elevation at the study sites was about 1,650 m. Both plant associations were dominated by post Euro-American settlement (<130 year old) *J. occidentalis* woodlands (Phase 3 woodlands). *J. occidentalis* encroachment had largely eliminated the shrub layer and depleted the understory. *Poa bulbosa*, a nonnative invasive perennial grass, was the most common herbaceous plant in both associations. *Bromus tectorum*, a nonnative annual grass, was present in trace amounts on the Needlegrass association.

Climate is typical of the northern Great Basin, with the majority of precipitation arriving between November and May, whereas summers are warm and dry. Annual precipitation (October 1–Sept. 30) at the SNOTEL site on South Mountain (12.5 km north of the study area at 1,980 m elevation) has averaged 853 mm the past 25 years (1982–2006) (Natural Resource Conservation Service [NRCS] 2009). Precipitation at the South Mountain SNOTEL, which is 330 m higher in elevation, is likely greater than our study sites, as western juniper typically grows in areas receiving 260–460 mm of annual precipitation (Miller and others 2005). Ecological site descriptions for the study's associations indicate that they were in a 305–406 mm precipitation zone (Natural Resource Conservation Service [NRCS] 2010a). Precipitation was about average during the post-fire (2003–2006) period. Soils were described to the subgroup at each site and were identified as Pachic Argixerolls. The Columbiana sites had a deeper A horizon (A1, 0–10 cm; A2, 10–30 cm) than the Needlegrass sites (A, 0–6 cm). Soil pH of the A horizon was 6.7 on the Columbiana sites and 7.4 in the Needlegrass sites.

Experimental Design and Treatment Application

The experimental design for each association was a randomized complete block design (Peterson 1985). Preparatory tree manipulations involved cutting trees with chainsaws in October 2002. Two levels of cutting were applied and included cutting 25% and 50% of post-settlement trees (based on tree density). For the Needlegrass association, treatments were Needlegrass25 (25% of the trees cut) and Needlegrass50 (50% of the trees cut). Similarly, for the Columbiana association, treatments were Columbiana25 and Columbiana50. Uncut and unburned woodlands (Needlegrass Control, Columbiana Control) were located adjacent to treated plots. Each treatment plot was 1.0 hectare in size and was replicated 5 times (40 plots total) per association. Cut trees dried for one year prior to fire application in fall 2003. Prescribed fires (strip head fire technique) were applied on October 21–22, 2003. All plots, aside from one Needlgrass25 plot, were successfully burned. A control plot in the Columbiana association was lost as a result of fire over-run. Burn conditions were typical for prescribed fire applications for treating encroaching western juniper woodlands (Table 1).

Fire severity was estimated by applying a severity index used by Bates and others (2006) for evaluating *P. tremuloides* community response to fire. The severity categories were light (1–30% mortality of perennial bunchgrasses, needles and small branches of downed *J. occidentalis* consumed, and ≤20% of western juniper killed), moderate (31–70% mortality of perennial bunchgrasses, large branches and trunks remained on downed *J. occidentalis*, and <70% of juniper killed), and high (71–100% mortality of perennial bunchgrasses, only trunks of downed *J. occidentalis* remaining, and >90% of *J. occidentalis* killed).

Table 1 Weather, fuel moisture, and fire conditions for western juniper cutting -prescribed fire treatments in mountain big sagebrush communities, South Mountain, Idaho in October, 2003

	Plant community	
	Needlegrass	Columbiana
Atmospheric conditions		
Air temperature (°C)	15–24	15–24
Relative humidity (%)	18–23	18–23
Wind speed (kph)	5–16	5–16
Soil water content (%, 0–10 cm)	7.6 ± 0.8	9.6 ± 0.5
Fuel moisture (%)		
Herbaceous	4.6 ± 0.2	5.7 ± 0.1
Surface litters	5.4 ± 0.4	5.9 ± 0.2
10 h	5.2 ± 0.4	6.0 ± 0.4
100 h	7.0 ± 0.2	7.3 ± 0.5
1000 h	10.8 ± 0.7	10.5 ± 0.6
Fire conditions		
Soil temp (2 cm below surface)		
Interspace/woodland floor (°C)	<79	79–204
Beneath cut trees (°C)	630–816	704–816
Canopy litter mats (°C)	177–630	204–704
Burn duration (min)	5–43	5–55
Flame length (m)	2–10	2–11

Perennial bunchgrass mortality estimates were derived from pre- and first year post-fire measurements of bunchgrass density.

Gravimetric soil water (0–10 cm) and fuel moisture for herbaceous fine fuels, litter, 1, 10, 100, and 1000-hour fuels were measured the day of fire application (Table 1). Fuel moisture and soil water content were determined by drying samples at 100°C to a constant weight. Weather data (RH, wind speed, temperature) were recorded prior to and during fire applications. Temperature and relative humidity were typical for fall prescribed fire application in the region. Burn duration (active flame) and flame lengths were also estimated.

Soil temperatures during the fires were estimated using Tempilaq[1] paints applied to 25 × 80 × 0.4 mm steel tags. Tempilaq paints melt or discolor at specific temperatures when heat is applied. Five sets of tags were placed 1 cm below the soil surface in each plant community at three locations. Tags were placed in interspaces, beneath live trees, and beneath cut trees. Sets consisted of 20 individual indicator tags and each tag was marked with its own indicator paint. Twenty temperature paints were used from 79°C to 1093°C (intervals between temperatures varied from 14°C at the lower temperatures to about 56°C at the higher temperatures). Temperature values were etched on the metal tags for identification.

Measurements

Pre-treatment vegetation (trees, shrubs, herbaceous) measurements were collected in June 2002. Post-fire measurements were gathered in June, 2004–2006. On each treatment plot, four 50-m transects were permanently established, with transects spaced 20 m apart. Cover of *J. occidentalis* and shrubs were estimated by line intercept (Canfield 1941) along each transect. Density of mature *J. occidentalis* (>2 m height) was estimated by counting all rooted individuals along four, 6 × 50 m belt transects. Density of shrubs and juvenile *J. occidentalis* (<2 m height) were estimated by counting all rooted individuals along four, 2 × 50 m belt transects. Understory canopy cover (by species) and herbaceous perennial density (by species) was sampled inside 0.2 m^2 frames (0.4 × 0.5 m). Frames were placed every 2 m along transect lines. A species list (richness) was compiled for each treatment plot, with scientific nomenclature following the Natural Resource Conservation Service Plant Database (Natural Resource Conservation Service [NRCS] 2010b) and Hitchcock and Cronquist (1987). Herbaceous production was measured by functional group in 2006, using 15, 1-m^2 frames per treatment plot. Herbage was clipped to 4-cm stubble for perennial bunch grasses and to ground level for rhizomatous perennial grasses, annual grasses, and perennial and annual forbs.

Statistical Analysis

Repeated measures analysis of variance (PROC MIXED procedure, SAS Institute, Cary, North Carolina) for a randomized complete block design was used to test for year, treatment, and year by treatment interaction for herbaceous, shrub, and *J. occidentalis* response variables. Plant associations were analyzed separately because of differences in herbaceous composition and soil characteristics. Response variables were *J. occidentalis* cover and density, shrub cover and density, cover (species and life form, bare ground, and surface litter), and herbaceous density (species and life form). Herbaceous life forms were grouped as *Poa secunda* Vasey (Sandberg's bluegrass), *P. bulbosa*, rhizomatous perennial grasses (primarily *Poa pratensis* L. (Kentucky bluegrass)), deep-rooted perennial bunchgrasses (e.g., Idaho fescue, Columbia needlegrass, and Letterman's needlegrass), *B. tectorum*, perennial forbs, and annual forbs. An auto regressive order one covariance structure was used because it provided the best fit for data analysis (Littell and others 1996). Mean separation involved comparison of least squares using the LSMEANS statement (SAS Institute 2002). The models included block (5 blocks; $df = 4$), year ($df = 3$), treatment ($df = 2$), and year by treatment interaction ($df = 6$; with the error term $df = 92$). Because of a strong year effect, years were analyzed separately using a general linearized model (PROC GLM, SAS Institute, 2007) for a randomized complete block to simplify presentation of results and to assist in explaining interactions (model: 5 blocks, $df = 4$; 4 treatments, $df = 3$). Data were tested for normality using the SAS univariate procedure. Data not normally distributed were arcsine square-root transformed to stabilize variance. Back transformed means are reported. Statistical significance for all tests was set at $P < 0.05$.

Results

Juniper Removal and Fire Severity

The burn treatments in both associations eliminated almost all remaining *J. occidentalis* trees, regardless of cutting level. On the Columbiana association, the fires killed 95–99% of the remaining trees, and *J. occidentalis* cover was reduced by 99% (Fig. 1a, b). On the Needlegrass

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[1] Tempilaq paints are manufactured by Tempil, South Plainfield, New Jersey, 07080, USA. Mention of trade names does not imply endorsement by USDA-ARS, Eastern Oregon Agricultural Research Center, and Oregon State University.

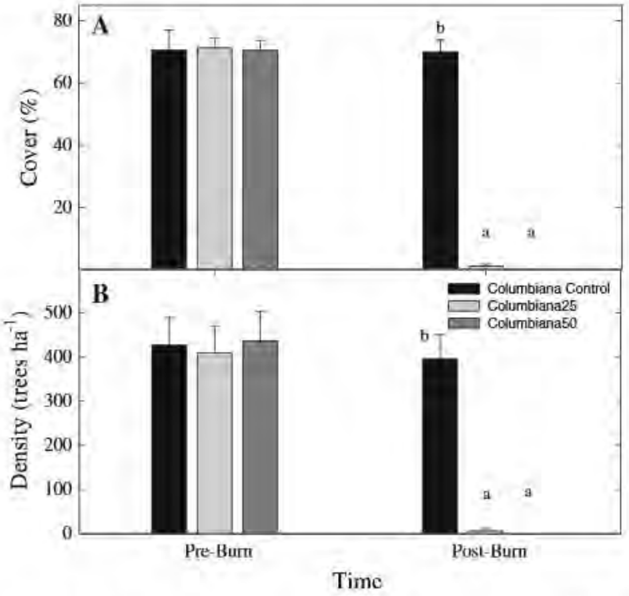

Fig. 1 Pre-fire and post-fire western juniper cover (**a**) and density (**b**) for the Columbiana plant association, South Mountain, Idaho (2002–2006). Treatments are Columbiana Control (untreated control), Columbiana 25 (25% cut and prescribed burn), and Columbiana 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

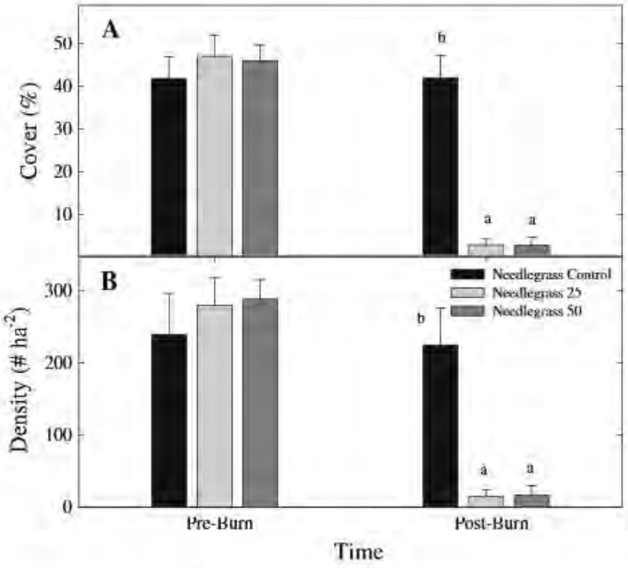

Fig. 2 Pre-fire and post-fire western juniper cover (**a**) and density (**b**) for the Needlegrass plant association, South Mountain, Idaho (2002–2006). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

association, fires killed 90–100% of the remaining trees, and *J. occidentalis* cover was reduced by 90–100% (Fig. 2a, b). In both plant associations, cut trees were either fully consumed or only the trunks remained. Perennial bunchgrass mortality exceeded 80% on the Columbiana plant association and all surface litter was consumed. Fires on the Columbiana association were judged to have been of high severity. Although litter and fuel consumption were largely complete in the Needlegrass association, mortality of perennial bunchgrasses was about 50%, thus, fire severity was concluded to be moderate. Soil temperatures during the fire were greater beneath cut trees and in canopy litter mats around stumps or live trees than the interspace and woodland floor. In the Needlegrass association, interspaces between trees were primarily bare ground, and soil temperature did not exceed 79°C. In both associations, soil temperatures (2 cm depth) beneath cut trees exceeded 704°C.

Columbiana Association: Herbaceous and Shrub Dynamics

Cover of perennial bunchgrasses ($P = 0.839$) and perennial forbs ($P = 0.958$) did not differ among the treatments, although cover increased by 100–130% and 100–180% in 2005 and 2006, respectively (Fig. 3a, b; $P < 0.0001$). Perennial forb species that had greater cover in the Columbiana25 and Columbiana50 treatments after fire than the control were *Astragalus lentiginosus* Dougl. (specklepod milkvetch) (15% greater; $P = 0.040$), *Lupinus arbustus* L. (spur lupine) (20% greater; $P = 0.019$), and *Hydrophyllum capitatum* Dougl. (ballhead waterleaf) (10% greater; $P = 0.005$). Cover of *P. bulbosa* was reduced by about 70% in both cut-burn treatments (Fig. 3c; $P < 0.001$). Annual forb cover was 4–10-fold greater in the cut-and-burn treatments in the second and third year after fire (Fig. 3d; $P < 0.0001$). Total herbaceous cover was 70–100% greater in both cut-and-burn treatments in the second and third year after fire (Fig. 3e; $P < 0.001$). Annual species that had greater cover in both cut-burn treatments than the Columbiana control were *Collinsia parviflora* (Lindl) (blue eyed Mary) (2–7 fold greater; $P = 0.042$), *Collomia linearis* Nutt. (narrow-leaf collomia) (10–150 fold greater; $P = 0.001$), *Claytonia perfoliata.* (miner's lettuce) (2–15 fold greater; $P = 0.001$), *Epilobium minutum* (Lindl. ex Lehm) (willow-weed) (2–15 fold greater; $P = 0.017$), and *Cryptantha* spp. (Lehm.) (>1000 fold greater; $P < 0.001$). Other species and herbaceous functional groups exhibited neither treatment differences nor changes over time. Bare ground was 80–300% greater in the treated plots than the Columbiana control after fire ($P < 0.001$; Fig. 4a). The increase in bare ground resulted from a >90% reduction of *J. occidentalis* litter in the cut-burn treatments ($P < 0.001$; Fig. 4b). Herbaceous litter was 2–2.5 fold higher in the cut-burn treatments than the Columbiana control in 2006 ($P < 0.001$; Fig. 4c).

Perennial bunchgrass density was reduced by 70–85% after fire, thus, the Columbiana25 and Columbiana50

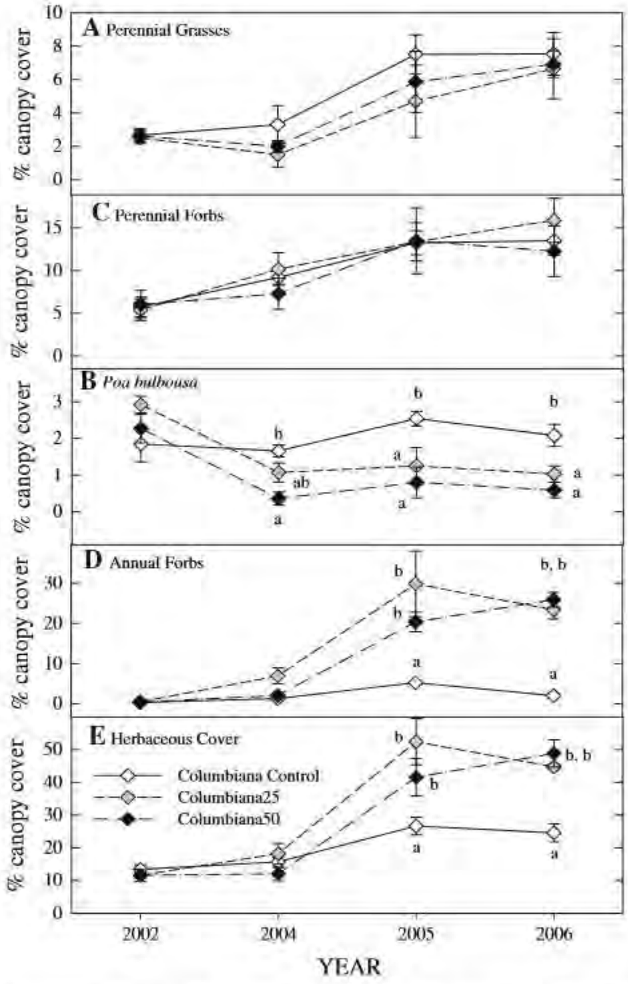

Fig. 3 Functional group cover (%) for the Columbiana plant association, South Mountain, Idaho (2002–2006): **a** perennial grasses; **b** bluegrass spp. (*P. bulbosa* and *P. secunda*); **c** perennial forbs; **d** annual forbs; and (**e**) total herbaceous. Treatments are Columbiana Control (untreated control), Columbiana 25 (25% cut and prescribed burn), and Columbiana 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

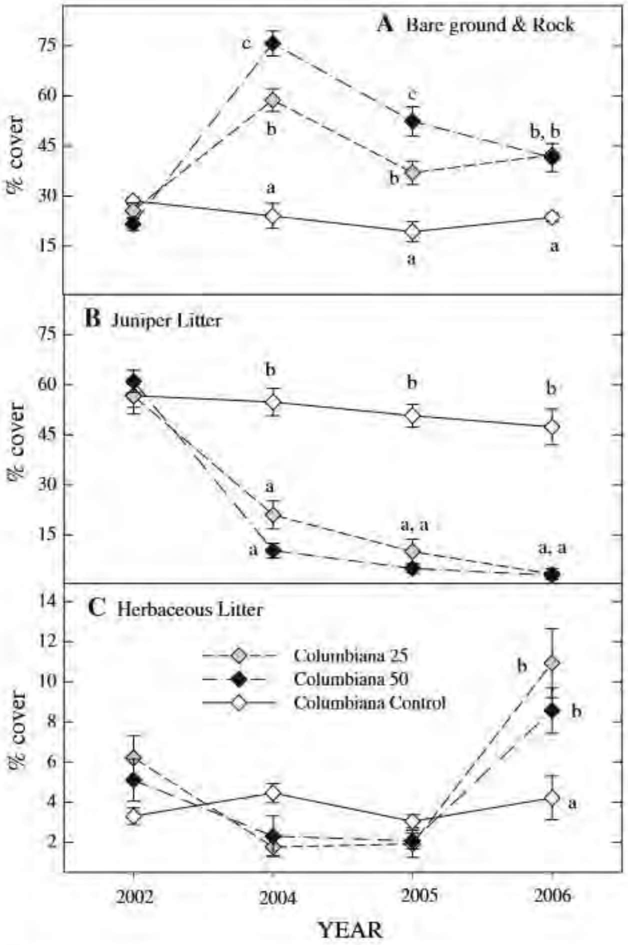

Fig. 4 Bare ground and litter covers (%) for the Columbiana plant association, South Mountain, Idaho (2002–2006): **a** bare ground and rock; **b** juniper litter; and **c** herbaceous litter. Treatments are Columbiana Control (untreated control), Columbiana 25 (25% cut and prescribed burn), and Columbiana 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

treatments were less than the Columbiana control ($P = 0.002$; Fig. 5a). In the third year after fire, bunchgrass grass seedling density was 100–180-fold greater in the cut-and-burn treatments indicating that perennial grasses were recovering rapidly ($P < 0.0001$; Fig. 5b). Perennial forb density was 2-fold greater in the Columbiana control than the Columbiana25 treatment in 2006 ($P = 0.003$; Fig. 5c). *Poa bulbosa* density was reduced by 95% in both cut-and-burn treatments after fire ($P = 0.008$). The number of perennial forb ($P = 0.027$), annual forb ($P < 0.001$), and total herbaceous ($P < 0.001$) species in all treatments increased by 40–60% between 2002 and other measurement years but did not differ among treatments (perennial forb, $P = 0.078$, annual forb, $P = 0.265$, total herbaceous, $P = 0.251$).

Total herbaceous production was about 3-fold greater in the Columbiana25 and Columbiana50 treatments than the Columbiana control in 2006 ($P = 0.020$; Fig. 6). Annual forb biomass was the only functional group that was greater in the cut-burn treatments than the Columbiana control (15–28 fold greater; $P = 0.015$).

A. tridentata spp. *vaseyana* was eliminated by the burn treatments. However, because densities and cover values were low prior to burning, treatments did not differ ($P = 0.526$ and $P = 0.456$, respectively). *S. oreophilus* and *Chrysothamnus nauseous* (Pall) Britt. (gray rabbitbrush) resprouted after fire, however, no treatment differences were detected in density and cover. *Ceanothus*

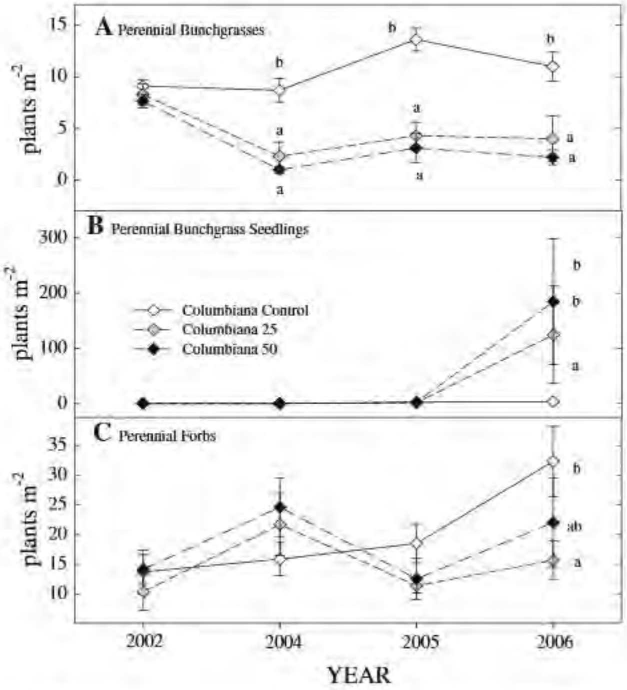

Fig. 5 Herbaceous perennial densities (# m^{-2}) in the Columbiana plant association, South Mountain, Idaho (2002–2006): **a** perennial grasses; **b** perennial forbs; **c** perennial bunchgrass seedlings. Treatments are Columbiana Control (untreated control), Columbiana 25 (25% cut and prescribed burn), and Columbiana 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

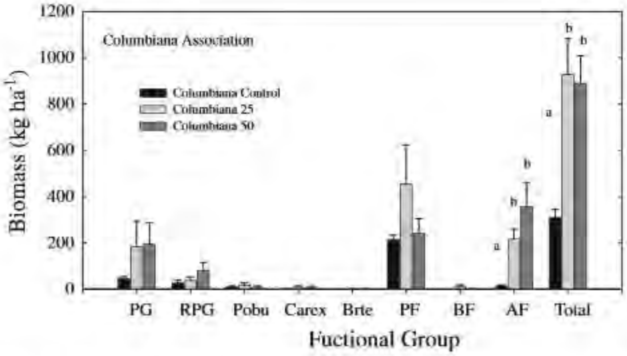

Fig. 6 Biomass (kg ha^{-1}) production in the Columbiana plant association, South mountain, Idaho, 2006. Functional groups are; perennial bunchgrass (PG); rhizomatous grasses (RPG); *P. bulbosa* (Pobu); carex species (Carex); *B. tectorum* (Brte); native perennial forb (PF); non-native biennial forb (BF); annual Forb (AF); and total herbaceous production. Treatments are Columbiana Control (untreated control), Columbiana 25 (25% cut and prescribed burn), and Columbiana 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

velutinus Dougl. (snowbrush), which was not present prior to burning, increased in density in the Columbiana25 and Columbiana50 treatments ($P = 0.0056$).

Needlegrass Association: Herbaceous and Shrub Dynamics

Perennial bunchgrass cover increased about 3 fold in all treatments during the study ($P < 0.001$; Fig. 7a). *Bromus tectorum* cover did not change in response to treatment or across years ($P = 0.082$ and $P = 0.235$, respectively; Fig. 7b). *P. bulbosa* was reduced in cover by 80% in the Needlegrass25 and Needlgrass50 treatments ($P = 0.031$). Cover of perennial forbs was 2–3 fold higher in the cut-burn treatments than the Needlegrass control ($P = 0.018$; Fig. 7c). Annual forbs cover was 4–10-fold greater and total herbaceous cover was 2.5 times greater in the cut-burn treatments than the control in the second and third year after fire ($P < 0.001$ and $P = .005$, respectively; Fig. 7d, e). Bare ground increased about 15% the first year after fire in the cut-burn treatments, however, in subsequent years

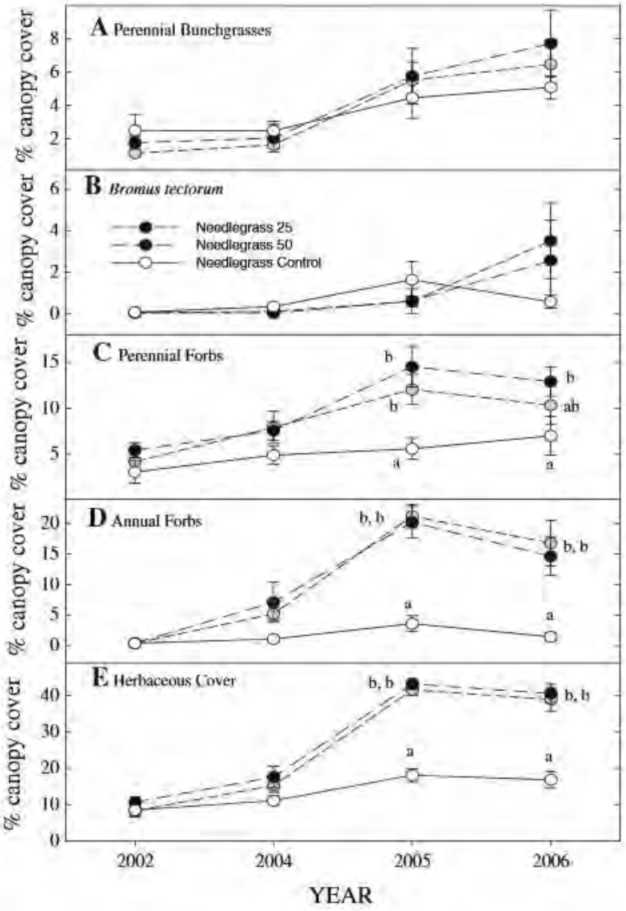

Fig. 7 Functional group cover (%) for the Needlegrass plant association, South Mountain, Idaho (2002–2006): **a** perennial grasses; **b** *B. tectorum*; **c** perennial forbs; **d** annual forbs; and **e** total herbaceous. Treatments are Needlegrass Control (untreated control), Needlegrass 25 (25% cut and prescribed burn), and Needlegrass 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

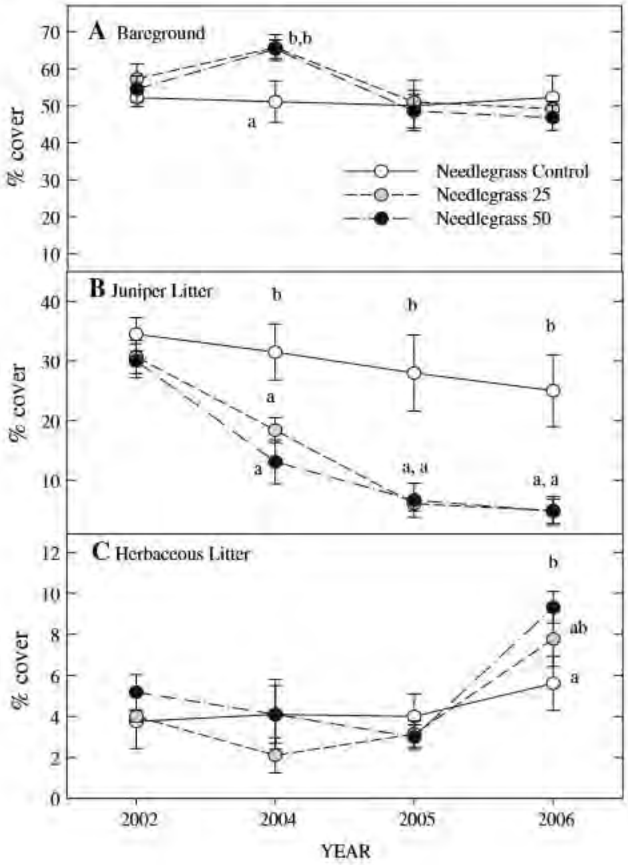

Fig. 8 Bare ground and litter covers (%) for the Needlegrass plant association, South Mountain, Idaho (2002–2006): **a** bare ground and rock; **b** juniper litter; and **c** herbaceous litter. Treatments are Needlegrass Control (untreated control), Needlegrass 25 (25% cut and prescribed burn), and Needlegrass 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

there were no treatment differences ($P = 0.308$; Fig. 8a). *J. occidentalis* litter was reduced about 5-fold after fire in both cut-burn treatments ($P = 0.045$; Fig. 8b). Herbaceous litter increased in all treatments by about 50% and was greatest in the Needlgrass50 treatment the third year after fire ($P = 0.0173$; Fig. 8c). Annual forb species that increased after fire in the cut-burn treatments and were greater than the control were *C. parviflora* (2–5 fold greater, $P = 0.002$), *C. linearis* (2–7 fold greater, $P = 0.001$), *M. gracilis* (3–4 fold greater, $P = 0.005$), *Cyrptantha* spp. (100 to140 fold greater, $P < 0.001$) and *Gayophytum* spp. (4–7 fold greater, $P < 0.001$).

Perennial bunchgrass density decreased 50% after fire ($P = 0.005$) in the Needlegrass25 and Needlgrass50 treatments, and both remained less than the Needlegrass control during the study ($P = 0.0017$; Fig 9a). However, in 2006, the third year after fire, grass seedling density was 30–60 times greater in the cut-and-burn treatments than the Needlegrass control ($P = 0.023$; Fig. 9b). Densities of *P. bulbosa* ($P = 0.031$) and *P. secunda* ($P = 0.0364$) were reduced 75% and 50% respectively in the cut-burn treatments. Perennial forb density increased in all treatments after 2002 ($P < 0.001$); however the increase was greater in the cut-burn treatments than the Needlegrass control ($P = 0.018$; Fig. 9c). The number of perennial ($P < 0.001$) and annual forb species ($P < 0.001$) identified increased by 30% in 2005 and 2006 and were greater in both cut-burn treatments than the control. *A. tridentata* spp. *vaseyana* and *Purshia tridentata* (Pursh) DC. (antelope bitterbrush) remained present in the cut-burn treatments, and there were no treatment differences ($P = 0.336$). *C. velutinus* increased in density in both treatments the first growing season after fire and was greater than the Needlegrass control ($P = 0.027$).

Production of perennial bunchgrass ($P = 0.017$), perennial forbs ($P = 0.028$), annual forbs ($P = 0.022$), and total herbaceous biomass ($P < 0.001$) was greater in the Needlegrass25 and Needlgrass50 treatments in 2006 (Fig. 10). Perennial grass biomass and total herbaceous biomass were about three times greater in the cut-burn treatments than the control.

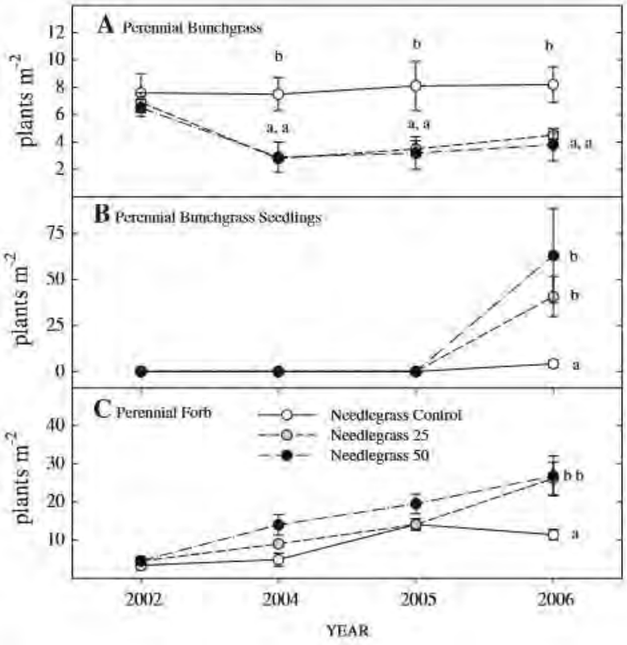

Fig. 9 Herbaceous perennial densities (# m^{-2}) for the Needlegrass plant association, South Mountain, Idaho (2002–2006): **a** perennial grasses; **b** perennial forbs; **c** perennial bunchgrass seedlings. Treatments are Needlegrass Control (untreated control), Needlegrass 25 (25% cut and prescribed burn), and Needlegrass 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

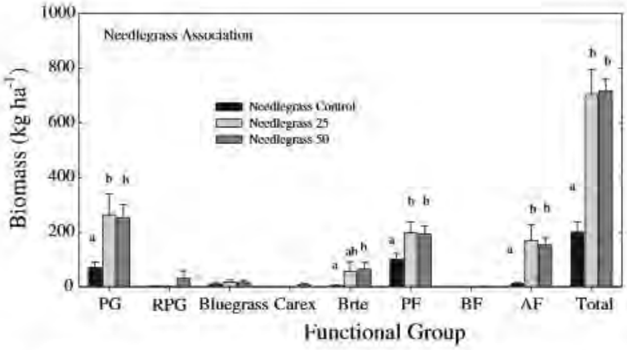

Fig. 10 Biomass (kg ha^{-1}) production in the Needlegrass plant association, South mountain, Idaho, 2006. Functional groups are; perennial bunchgrass (PG); rhizomatous grasses (RPG); *P. bulbosa* and *P. secunda* (Bluegrass); carex species (Carex); *B. tectorum* (Brte); native perennial forb (PF); non-native biennial forb (BF); annual Forb (AF); and total herbaceous production. Treatments are Needlegrass Control (untreated control), Needlegrass 25 (25% cut and prescribed burn), and Needlegrass 50 (50% cut and prescribed burn). Data are in means ± SE. Means sharing a common lower case letter are not significantly different ($P > 0.05$)

Discussion

Treatment Differences

This study demonstrated that late successional (Phase 3) *J. occidentalis* woodlands can be burned successfully after pre-cutting a portion of the trees. After drying for one year, the cut trees carried the fire, which killed most remaining *J. occidentalis*. We had expected a gradient of response in *J. occidentalis* control and understory recovery. However, the levels of *J. occidentalis* control, litter and fuel consumption, mortality of perennial bunchgrasses, and understory response were independent of cutting level because treatments within each association responded similarly to the fires.

In the Columbiana association, the lack of differences between the cut-burn treatments was likely a result of woodland characteristics, fuel conditions, and weather. The woodland floor was largely covered with a mat of *J. occidentalis* leaf litter and, relative to the Needlegrass community, the higher tree cover and density resulted in more material on the ground after cutting. Coupled with very dry conditions and high fuel consumption, the fire treatments had equally severe impacts to the understory. Perennial grass crowns were typically observed to be elevated above the soil in the *J. occidentalis* litter layer, which likely contributed to the high mortality. The impacts of the fires to the understory and early successional stages were similar to those documented for high intensity/severity fires in many forested systems of the western United States and Canada (Brown and Smith 2000). In *Pinus ponderosa* Dougl. (ponderosa pine) forest, perennial grass cover decreased as fire intensity and litter consumption increased (Armour and others 1984). In *P. tremuloides* woodland, pre-cutting one-third of encroaching *J. occidentalis* followed by prescribed fire in the fall resulted in complete consumption of the organic layer, killed almost all perennial grasses, and severely reduced perennial forb recovery (Bates and others 2006).

In the Needlegrass community, the interspace was mostly bare ground. Cutting in similar, open *J. occidentalis* stands reduces the interspace area because of increased coverage by down trees (Bates and others 1998; Bates and Svejcar 2009). Because the Needlegrass50 treatment had twice as many trees on the ground as the Needlegrass25 treatment we had expected to measure greater negative impacts of fire to understory vegetation. Although we did not differentiate among interspaces and areas occupied by cut or standing trees most of the perennial bunchgrass mortality appeared to be beneath down or standing trees, where there was an accumulation of *J. occidentalis* leaf litter. We suspect that cutting 25% of the trees compared to cutting 50% of the trees may not produce that much of a difference (less than 5%) in the amount of interspace covered by trees. This likely explains the lack of differences between the two cut-and-burn treatments in perennial grass mortality and post-fire understory response.

Western Juniper Control

Cutting a minimum of 25% of the mature trees in communities dominated by *J. occidentalis* (cover of 35–70%) was sufficient to remove the majority of remaining live trees during fall prescribed fire application. Cutting more than 25% of the trees was unnecessary when broadcast burning was applied with weather conditions typically encountered with fall prescribed fire. Burning was equally effective on slopes (Columbiana and Needlegrass sites, 10–60% slopes) and on flat ground (Columbiana sites). The 50% pre-fire cutting levels were excessive, particularly in the Columbiana plant community. In *P. tremuloides* woodland, with similar levels of cover and density of *J. occidentalis*, only a third of the trees were cut prior to prescribed fire (Bates and others 2006). Cutting less than 25% (10–20%) of the woodland trees in the Columbiana plant community would likely have been sufficient to kill remaining *J. occidentalis* under the conditions the prescribed fire was applied and may have reduced the adverse effects to the herbaceous layer. If management objectives are to retain some trees on site reducing cutting levels may also reduce fire mortality of remaining *J. occidentalis*, especially in the Needlegrass association which was a more open stand.

The plot size used in our study was small (1 ha), however, the treatments applied are readily scaled up to larger landscape projects in other *Pinus-Juniperus* woodlands. Large scale projects (300–2500 ha) conducted by federal land management agencies, involving the cutting of about 33% of the trees prior to fire, have been used in several shrub-steppe restoration studies in *J. occidentalis* woodlands (Bates and others 2006; Bates and others 2007b). Approximately 30,000 ha of *J. occidentalis* woodlands have been treated using partial cutting and prescribed fire control measures in eastern Oregon. At the larger scales, managers can adjust cutting levels or leave some woodland areas uncut to create a landscape mosaic of burned and unburned areas.

Understory Release

Secondary succession in woodland and forest ecosystems after wild or prescribed fire often varies in composition and recovery rate as a result of varying fire severity, nutrient and water availability, site characteristics, herbivory, and weather (Armour and others 1984; Barney and Frischknecht 1974; Griffis and others 2001; Koniak 1985; Oswald and Covington 1983; Sabo and others 2009). Because of severe fire effects to perennial grasses, early succession in the cut-and-burn treatments in both plant communities was largely dominated by annual and perennial forbs. These results are similar to early successional dynamics following wildfire in *Pinus-Juniperus* woodlands of Nevada (Barney and Frischknecht 1974; Koniak 1985), and ponderosa pine forests in Arizona (Griffis and others 2001; Laughlin and Fulé 2008; Sabo and others 2009). The increase in understory productivity and cover following overstory removal in *J. occidentalis* woodlands has been linked to increased soil water and nitrogen availability (Bates and others 2000; Bates and others 2002).

Both Columbiana and Needlegrass sites remain open to colonization by native and invasive species. However, because there were large numbers of perennial bunchgrass seedlings in 2006, both communities had a high recovery potential. Many perennial grass seedlings appeared to have established (i.e., seedling growth in June 2006 was the 3rd to 4th leaf stage) using criteria developed by Reis and Svejcar (1991). The reduction and lack of recovery of *P. bulbosa* after fire indicate that this species may be effectively controlled by fire treatments when present in *J. occidentalis* woodlands. Although *B. tectorum* was a minor component of herbaceous response in the Needlegrass association, in areas of litter accumulation (litter mats surrounding stumps and beneath cut trees), where perennial grasses were largely eliminated, *B. tectorum* dominated early succession. Despite presence of *B. tectorum* in these locations, perennial grass seedlings were establishing in these zones in 2006 which was likely aided by above average precipitation in late spring (Sheley and Bates 2008). In other *J. occidentalis* control projects, it has not been unusual for perennial grasses to establish and increase despite enhanced densities and biomass of *B. tectorum* (Vaitkus and Eddleman 1987; Miller and others 2005; Bates and others 2005; Bates and others 2007b; Bates and Svejcar 2009). However, there are cases when *B. tectorum* has dominated following *Pinus-Juniperus* treatment including cutting (Vaitkus and Eddleman 1987), chaining (Tausch and Tueller 1977), fire (Barney and Frischknecht 1974; Bates and others 2007b; Quinsey 1984), slash burning (Haskins and Gehring 2004), and herbicide application (Evans and Young 1985).

Differences in *B. tectorum* response and site recovery after treating *J. occidentalis* and other *Pinus-Juniperus* woodlands is likely linked to species composition and herbaceous perennial density. Bates and others (2005) determined that 2–3 bunchgrasses per m^2 were sufficient to restore the native understory after cutting Phase *3 J. occidentalis* woodlands that were susceptible to *B. tectorum* invasion. In our study, where natives dominated post-fire recovery, densities of perennial grasses were greater than 1–2 plants m^2 and perennial forbs greater than 5 plants m^2 the first year after fire. Dominance by *B. tectorum* is most likely to occur where there is little perennial herbaceous vegetation remaining after juniper treatment (Evans and Young 1985; Bates and others 2007b). Where *B. tectorum* has dominated after fire, post-fire densities of perennial grasses were less than 1 plant m^2 and perennial forbs were less than 5 plants m^2 (Bates and others 2006; Bates and others 2007a, b).

Sagebrush-Steppe Restoration

Partial cutting and prescribed fire combinations are a recent management treatment to remove Phase 3 *J. occidentalis* woodlands and restore shrub-steppe plant communities. Previously, treatments using heavy machinery or chainsaws were the most common practice for managing Phase 3 woodlands because applying controlled fires was problematic (Miller and others 2005). However, mechanical treatment of *J. occidentalis* woodlands is often more expensive compared to prescribed fire treatments. Thus, partial cutting and prescribed fire combinations provide land managers with an additional treatment option for managing other Phase 3 *Pinus-Juniperus* woodlands. One difficulty in applying this treatment is predicting plant community response. Shrub and herbaceous recovery after *J. occidentalis* control is generally predictable when the plant communities are still in the early stages (Phase 1 and 2) of woodland development and contain an intact understory of shrubs and native herbaceous species (Miller and others 2005). In fully developed woodlands (Phase 3), predicting community response is difficult because recovery is often slower and these areas are often susceptible to non-native weed invasion and dominance as a result of depleted native understories. In this study, native annual and perennial vegetation has dominated early succession. In other studies, fall burning partially cut Phase 3 woodlands severely impacted herbaceous understory vegetation, resulting in the nearly complete removal of perennial bunchgrasses and a high percentage of the perennial forbs (Bates and others 2006; Bates and others 2007b). The main understory species to respond in these studies were nonnative biennial weeds, *B. tectorum*, and native annual forbs. Haskins and Gehring (2004) measured a fourfold higher abundance of invasive annuals in burned *Pinus-Juniperus* slash areas compared to unburned slash treatments. In *P. ponderosa* forests of Arizona, invasive species tend to increase in areas of greater fire severity (Bataineh and others 2006; Griffis and others 2001; Sabo and others 2009). To augment herbaceous recovery after fire, particularly on sites with high bunchgrass mortality, seeding should be considered. On Columbiana and Needlegrass associations, seeding was successful at establishing high densities of perennial bunch grasses and forbs (Sheley and Bates 2008).

Herbaceous recovery after *J. occidentalis* control requires patience. Delays of several years are typical before understories fully respond to tree removal (Barney and Frischknecht 1974; Bates and others 2000; Bates and others 2005; Bates and others 2007a; Bates and Svejcar 2009; Koniak 1985). Treated *J. occidentalis* sites with depleted understories have taken six years for perennial grass densities to recover and over 10 years for perennial grass cover to be restored (Bates and others 2005). Bunchgrasses require two to three years to produce large amounts of viable seed following fire or tree cutting (Bates 2005; Bates and others 2009). Recruitment of new bunchgrasses tends to occur the third to fifth year following *J. occidentalis* treatment (Bates and others 2005; Bates and Svejcar 2009). In our study, a similar post-fire response occurred in the Columbiana and Needlegrass associations.

Altering season of prescribed fire application in Phase 3 *J. occidentalis* woodlands has been shown to reduce fire impacts on native plant species. Cutting followed by winter or early spring burning when soils were frozen and/or above field capacity lowered mortality of native plants and resulted in faster understory recovery (Bates and others 2006; Bates and Svejcar 2009). Winter and spring applied fires were not as successful at killing remaining *J. occidentalis* trees and juveniles compared to fall burned treatments because of lower fire severities and higher fuel moisture (Bates and others 2006). Thus, managers should be aware that *Pinus-Juniper* trees will likely reoccupy sites treated by winter-spring burning in a shorter time period than fall burned areas. However, if restoration objectives are to retain some *J. occidentalis* or other *Pinus-Juniper* species on site, then winter and spring burning provides managers with additional treatment options.

Recovery periods of shrub species on both community types will likely take longer than reported in the literature because shrub cover and density were already suppressed by *J. occidentalis* dominance and the fire killed non-sprouting species. Recovery of non-sprouting shrubs, particularly *A. t.* ssp. *vaseyana,* may exceed 40 years due to fire-caused mortality of remaining shrubs and a depleted seed bank. Typical recovery periods for *A. t.* ssp. *vaseyana* canopy cover have been reported to be between 20 and 40 years (Harniss and Murray 1973; Lesica and others 2007; Ziegenhagen and Miller 2009). Sprouting shrubs, especially *S. oreophilus* and *C. nauseous,* will likely recover to pre-invasion conditions faster because there was little fire caused mortality and these species typically increase after fire (Anderson and Bailey 1979; Sieg and Wright 1996; Wright and Bailey 1982). The emergence of *C. velutinus* was probably due to its presence in the seed bank. Viable seed of *C. velutinus* can be stored in soils for at least 200 years (Bradley and others 1992; Kramer and Johnson 1987). Browsing by *Odocoileus hemionus* (mule deer) and *Cervus canadensis nelsoni* (Rocky Mountain elk) was restricting further establishment and growth of *C. velutinous*.

Conclusions

Cutting-prescribed fire combinations are an effective means for controlling encroaching Phase 3 *J.* occidentalis woodlands, and could potentially be applied in other *Pinus-Juniperus* woodlands. When burning sites with comparable levels of *J. occidentalis* cover (35–70%) and density (150–475 trees ha^{-1}) a maximum of about one-quarter of the trees should be cut to carry prescribed fire. On similar plant associations, this method of *J. occidentalis* control can initially be expected to stimulate perennial and annual forbs. Perennial grasses will take longer to recover because of reduced densities that are a product of *J. occidentalis* dominance prior to treatment and fire-caused mortality. However, the high mortality sustained by herbaceous perennials, particularly bunchgrasses, increases the potential for cheatgrass or other exotic weeds to dominate areas (Bates and others 2006; Bates and others 2007b). Cutting and burning combinations are not recommended in areas where exotic weeds threaten to dominate after fire. When making site selections for *J. occidentalis* control, managers must carefully consider the potential benefits and problems associated with cutting-prescribed fire applications. If weeds are a threat then winter burning of cut trees or cutting and leaving trees to minimize perennial grass mortality is probably the best option. Because removing Phase 3 woodlands is difficult and expensive and offers less predictable results, managers involved with shrub-steppe restoration should first target *J. occidentalis* control efforts in Phase 1 and Phase 2 successional woodlands. These stages will generally have more intact and complete herbaceous and shrub layers, making restoration efforts more predictable and successful.

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From: Mermejo, Lauren [lmermejo@blm.gov]
Sent: Friday, August 14, 2015 10:13 AM
To: nvca sagegrouse
Subject: Fwd: Fire Info for GRSG Plan Amendments, Chapter one

---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Tue, Apr 7, 2015 at 2:51 PM
Subject: RE: Fire Info for GRSG Plan Amendments, Chapter one
To: Michael Hildner <mhildner@blm.gov>, Vicki Herren <vherren@blm.gov>, Stephen Small <ssmall@blm.gov>, Brian Amme <bamme@blm.gov>, Stephanie Carman <scarman@blm.gov>, Matthew Magaletti <mmagalet@blm.gov>

Looks really good from the Great Basin side….thanks! (I had our lead FIAT person review and she concurs!)

Lauren

From: Hildner, Michael [mailto:mhildner@blm.gov]
Sent: Tuesday, April 07, 2015 2:36 PM
To: Vicki Herren; Stephen Small; Brian Amme; Stephanie Carman; Matthew Magaletti; Lauren Mermejo
Subject: Fwd: Fire Info for GRSG Plan Amendments, Chapter one

Hi All,

Please see the attached revised Chap 1 drop in language for fire that Kristy wrote. There are now two versions--one for RM, and one for GB. She seems to have addressed our comments. Please take a look and let me know if you have any more comments. We can drop this in next week.

Michael

---------- Forwarded message ----------
From: **Swartz, Kristy** <kswartz@blm.gov>
Date: Tue, Apr 7, 2015 at 5:33 PM
Subject: Re: Fire Info for GRSG Plan Amendments, Chapter one
To: "Hildner, Michael" <mhildner@blm.gov>

Ok, not quite this morning but here's what I've come up with. You'll see that there are now two paragraphs - one with a GB flavor and one with a RM flavor.

Kristy Swartz

Fire Planner - BLM NIFC

E-Mail: kswartz@blm.gov

Office: 208-387-5326

Cell: 541-233-3519

On Mon, Apr 6, 2015 at 3:18 PM, Swartz, Kristy <kswartz@blm.gov> wrote:

Thanks Michael,

I think I can make the adjustments, I'll get you a fresh doc by tomorrow morning.

Kristy Swartz

Fire Planner - BLM NIFC

E-Mail: kswartz@blm.gov

Office: 208-387-5326

Cell: 541-233-3519

On Mon, Apr 6, 2015 at 2:03 PM, Hildner, Michael <mhildner@blm.gov> wrote:

Hi Kristy,

Thanks so much for drafting something. I shared it with our small group of sage-grouse project managers. Their feedback is below. Take a look and let me know if you can work something up to address the comments. Seems like just a couple tweaks. Thanks again, Michael

- Is it possible to make two of these, one for GB (UT, NV, ID, OR) and one for RM (WY, CO, MT), to highlight the importance of fire management in the GB. Also, please make clear whether the FIAT applies to just the GB or both the GB and RM.
- Is it possible to add more intro and schedule related to FIAT - where did it come from (was it discussed in the drafts?), where is it going, etc.
- I think the Secretarial Order stuff looks good, could add another sentence (such as examples of what activities or how the SO will ensure on-the-ground benefits to habitat)

On Thu, Apr 2, 2015 at 6:23 PM, Swartz, Kristy <kswartz@blm.gov> wrote:

Ok Michael,

Could you take a peek and see if I'm on the right track?

Thanks!

Kristy Swartz

Fire Planner - BLM NIFC

E-Mail: kswartz@blm.gov

Office: 208-387-5326

Cell: 541-233-3519

On Thu, Apr 2, 2015 at 12:45 PM, Swartz, Kristy <kswartz@blm.gov> wrote:

Hi Michael,

I hear that Steven Small was looking for a paragraph from fire management regarding the Secretarial Order and FIAT assessments for Chapter 1 of the GRSG RMP Amendments and that you might have some starter info. for me?

Please let me know if there are any sideboards or timeframes for the paragraph.

Thank-you,

Kristy Swartz

Fire Planner - BLM NIFC

E-Mail: kswartz@blm.gov

Office: 208-387-5326

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Michael Hildner
Planning and Environmental Analyst
BLM Washington Office
202-912-7231
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Lauren L. Mermejo
Great Basin Greater Sage-Grouse Project Mgr.
BLM, Nevada State Office
775 861-6580

GBR_PUB_0645
7.16
06/02/2015

Laura Long

From: Beck, Jonathan <jmbeck@blm.gov>
Sent: Monday, March 09, 2015 7:02 AM
To: Meredith Zaccherio
Subject: Fwd: Important: Prescribed Fire Language

fire language
---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Wed, Mar 4, 2015 at 7:02 PM
Subject: Important: Prescribed Fire Language
To: Quincy Bahr <qfbahr@blm.gov>, Joan Suther <jsuther@blm.gov>, Randall Sharp <sharphay@att.net>, jmbeck@blm.gov
Cc: Glen Stein <gstein@fs.fed.us>, mdillon@fs.fed.us, Holly Prohaska <holly.prohaska@empsi.com>, Stephanie Carman <scarman@blm.gov>

Hi Folks –

After discussion with the FWS today, some slight changes to the prescribed fire drop-in language were requested in a) and b) below. Please use this language as your new drop in language – verbatim – as is below.

Sorry that this is such a cluster…..but what has to be, has to be!

Thanks for your patience…..I have a sneaking feeling that this won't be our last request.

Lauren

From: Carman, Stephanie [mailto:scarman@blm.gov]
Sent: Wednesday, March 04, 2015 2:53 PM
To: Lauren Mermejo; Matthew Magaletti
Cc: Michael Hildner; Vicki Herren; Edwin Roberson; Aaron Moody; Sarah Shattuck
Subject: Prescribed Fire Language

Lauren and Matt -

Please direct the planners to use the following updated drop-in language regarding the use of prescribed fire. Thank you for your patience.

"If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address:

- *why alternative techniques were not selected as a viable options;*
- *how Greater Sage-Grouse goals and objectives would be met by its use;*

- *how the COT Report objectives would be addressed and met;*
- *a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized.*

a) Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).

b)Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality."

Stephanie Carman

Bureau of Land Management

Sage-Grouse Project Coordinator (Acting)

office 202-208-3408

mobile 202-380-7421

scarman@blm.gov

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Jonathan Beck
Bureau of Land Management
Idaho State Office
208-373-4070

Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment

GBR_PUB_0661
7.16
10/1/2015

June 2014

Suggested Citation:

Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment (Fire and Invasive Assessment Tool (FIAT)). June 2014. Prepared by Fire and Invasive Assessment Team (Appendix 5). 43 pages.

Introduction and Background

The purpose of this assessment is to identify priority habitat areas and management strategies to reduce the threats to Greater Sage-Grouse resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The Conservation Objectives Team (COT) report (USFWS 2013) and other scientific publications identify wildfire and conversion of sagebrush habitat to invasive annual grass dominated vegetative communities as two of the primary threats to the sustainability of Greater Sage-Grouse (*Centrocercus urophasianus*, hereafter sage-grouse) in the western portion of the species range. For the purposes of this assessment protocol, invasive species are limited to, and hereafter referred to, as **invasive annual grasses** (e.g., primarily cheatgrass [*Bromus tectorum*]). Conifer expansion (also called encroachment) is also addressed in this assessment.

The United States Fish and Wildlife Service (USFWS) will consider the amelioration of impacts, location and extent of treatments, degree of fire risk reduction, locations for suppression priorities, and other proactive measures to conserve sage-grouse in their 2015 listing decision. This determination will be made based in part upon information contained in the United States (US) Department of the Interior, Bureau of Land Management (BLM) resource management plan (RMP) amendments and Forest Service land resource management plan (LRMP) amendments, including this assessment.

This assessment is based in part on National Resources Conservation Service (NRCS) soil surveys that include geospatial information on soil temperature and moisture regimes associated with resistance and resiliency properties (see following section on *Soil Temperature and Moisture Regimes)*. While this assessment is applicable across the range of sage-grouse, the analysis is limited to Western Association of Fish and Wildlife Management Agencies' (WAFWA) Management Zones III, IV, and V (roughly the Great Basin region) because of the significant issues associated with invasive annual grasses and the high level of wildfires in this region. The utility of this assessment process is dependent on incorporating improved information and geospatial data as it becomes available. Although the resistance and resilience concepts have broad applications (e.g., infrastructure development), this assessment is limited to developing strategies to reduce threats to sage-grouse habitat (e.g., invasive annual grasses and wildfires).

Draft Greater Sage-Grouse Environmental Impact Statements (EISs) contain a suggested framework in the appendices ("Draft Greater Sage-Grouse Wildland Fire and Invasive Species Assessment") that provided a consistent approach to conduct these assessments. The current protocol was developed by the Fire and Invasive Species Team (FIAT), a team of wildland fire specialists and other resource specialists and managers, to specifically incorporate resistance to invasive annual grasses and resilience after disturbance principles into the assessment protocol. This protocol is also referred to as the Fire and Invasive Tool. In October 2013, the BLM, Forest Service, and USFWS agreed to incorporate this approach into the final EISs.

The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers et al. 2014) and the USFWS-sponsored project with the Western Association of Fish and Wildlife Agencies (WAFWA) to assemble an interdisciplinary team to provide additional information on wildland fire and invasive plants and to develop strategies for addressing these issues. This interagency collaboration between rangeland scientists, fire specialists, and sage-grouse biologists resulted in the development of a strategic, multi-scale approach for employing ecosystem resilience and resistance concepts to manage threats to sage-grouse habitats from wildfire and invasive annual grasses (Chambers et al. 2014). This paper has been published as a Forest Service Rocky Mountain Research Station General Technical Report RMRS-GTR-326 and is posted online at http://www.fs.fed.us/rm/pubs/rmrs_gtr326.pdf. It serves as the reference and basis for the protocol described in this assessment.

The assessment process sets the stage for:

- Identifying important sage-grouse occupied habitats and baseline data layers important in defining and prioritizing sage-grouse habitats
- Assessing the resistance to invasive annual grasses and resilience after disturbance and prioritizing focal habitats for conservation and restoration
- Identifying geospatially explicit management strategies to conserve sage-grouse habitats

Management strategies are types of actions or treatments that managers typically implement to resolve resource issues. They can be divided into proactive approaches (e.g., fuels management and habitat recovery/restoration) and reactive approaches (e.g., fire operations and post-fire rehabilitation). Proactive management strategies can favorably modify wildfire behavior and restore or improve desirable habitat with greater resistance to invasive annual grasses and/or resilience after disturbances such as wildfires. Reactive management strategies are employed to reduce the loss of sage-grouse habitat from wildfires or stabilize soils and reduce impacts of invasive annual grasses in sage-grouse habitat after wildfires. Proactive management strategies will result in long-term sage-grouse habitat improvement and stability, while reactive management strategies are essential to reducing current impacts of wildfires on sage-grouse habitat, thus maintaining long-term habitat stability. Management strategies include:

Proactive Strategies-

1. **Fuels Management** includes projects that are designed to change vegetation composition and/or structure to modify fire behavior characteristics for the purpose of aiding in fire suppression and reducing fire extent.

2. **Habitat Restoration/Recovery**
   a. Recovery, referred to as passive restoration (Pyke 2011), is focused on changes in land use (e.g., improved livestock grazing practices) to achieve a desired outcome where the plant community has not crossed a biotic or physical threshold.
   b. Restoration is equivalent to active restoration (Pyke 2011) and is needed when desired species or structural groups are poorly represented in the community and reseeding, often preceded by removal of undesirable species, is required. Note: The Fuels Management program supports recovery/restoration projects through its objective to restore and maintain resilient landscapes.

Reactive Strategies-

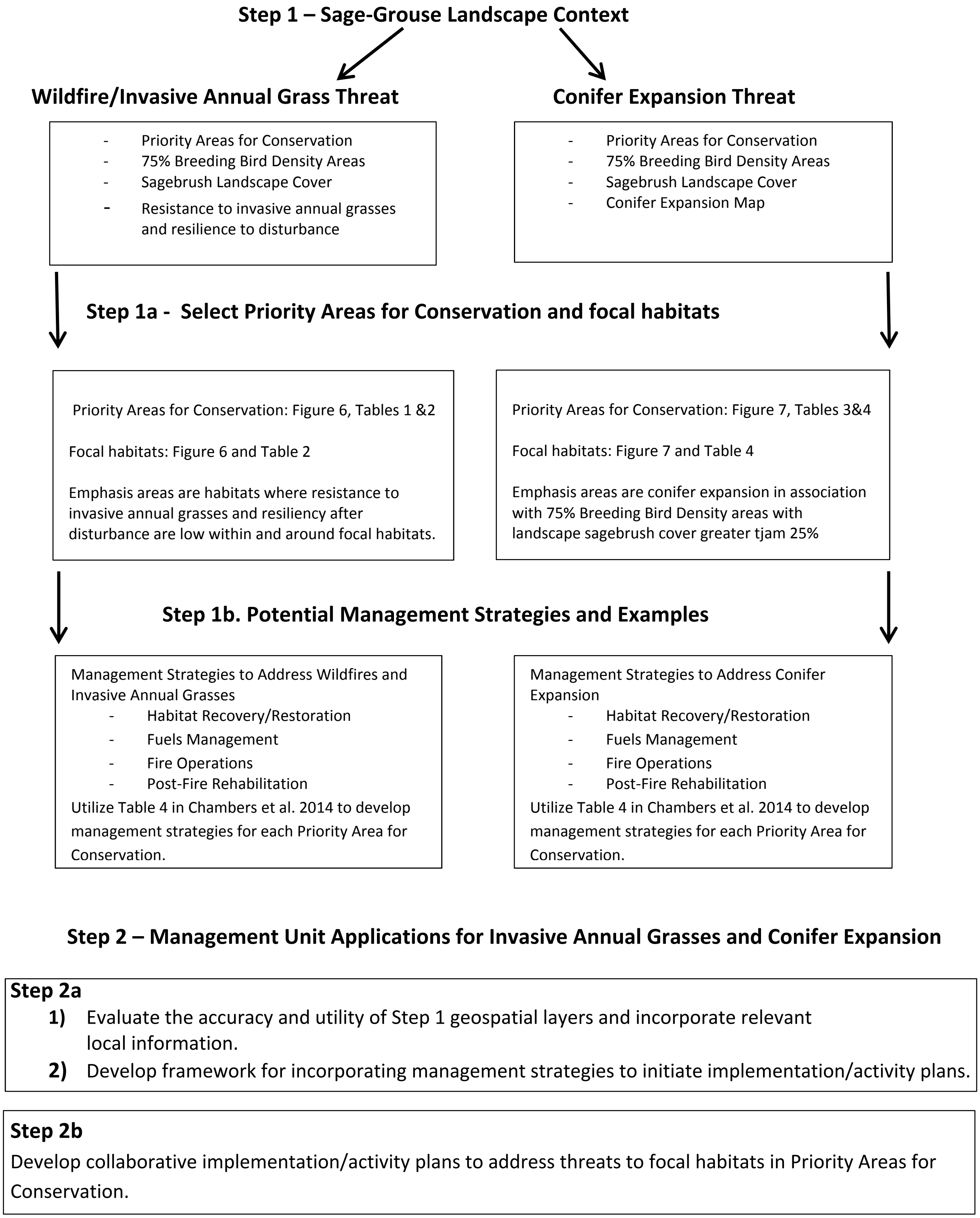
3. **Fire Operations** includes preparedness, prevention, and suppression activities. When discussing specific components of fire operations, the terms fire preparedness, fire prevention and fire suppression are used.

4. **Post-Fire Rehabilitation** includes the BLM's Emergency Stabilization and Rehabilitation (ES&R) Program and the Forest Service's Burned Area Emergency Response (BAER) Program. Policy limits application of funds from 1 to 3 years, thus treatments to restore or enhance habitat after this period of time are considered habitat recovery/restoration.

The assessment process included two steps with sub-elements. First, important Priority Areas for Conservation (PACs) and focal habitats are identified (**Step 1a**). Second, potential management **strategies** (described above) are identified to conserve or restore focal habitats threatened by wildfires, invasive annual grasses, and conifer expansion (primarily pinyon pine and/or juniper species; **Step 1b**). Focal habitats are the portions of a PAC with important habitat characteristics, bird populations, and threats (e.g., wildfires, invasive annual grasses, and conifer expansion) where this assessment will be applied. Areas adjacent to or near the focal habitats can be considered for management treatments such as fire control and fuels management if these locations can reduce wildfire impacts to focal habitats. Soil temperature and moisture regimes are used to characterize capacity for resistance to invasive annual grasses and resilience after disturbance (primarily wildfires) within focal habitats to assist in identifying appropriate management strategies, especially in areas with good habitat characteristics that have low recovery potential following disturbance. Soil moisture and temperature regime relationships have not been quantified to the same degree as for conifer expansion; however, Chambers et al. 2014) discuss preliminary correlations between these two variables.

The results of Steps 1a and 1b, along with associated geospatial data files, are available to local management units to complete Step 2 of the assessment process. Step 2 is conducted by local management units to address wildfire, invasive annual grasses, and conifer expansion in or near focal habitat areas. First, local information and geospatial data are collected and evaluated to apply and improve on Step 1 focal habitat area geospatial data (**Step 2a**). Second, focal habitat activity and implementation plans are developed and include prioritized management **tactics and treatments** to implement effective, fuels management, habitat recovery/restoration, fire operations, and post-fire rehabilitation strategies (**Step 2b**). This assessment will work best if Step 2b is done across management units (internal and externally across BLM and Forest Service administrative units and with other entities). **Figure 1**, Assessment Flow Chart, contains an illustration of the steps in the assessment process.

This analysis does not necessarily address the full suite of actions needed to maintain the current distribution and connectivity of sage-grouse habitats across the Great Basin because resources available to the federal agencies are limited at this time. Future efforts designed to maintain and connect habitats across the range will be needed as current focal areas are addressed and additional resources become available.



Step 1 – Sage-Grouse Landscape Context

Wildfire/Invasive Annual Grass Threat

- Priority Areas for Conservation
- 75% Breeding Bird Density Areas
- Sagebrush Landscape Cover
- Resistance to invasive annual grasses and resilience to disturbance

Conifer Expansion Threat

- Priority Areas for Conservation
- 75% Breeding Bird Density Areas
- Sagebrush Landscape Cover
- Conifer Expansion Map

Step 1a - Select Priority Areas for Conservation and focal habitats

Priority Areas for Conservation: Figure 6, Tables 1 &2

Focal habitats: Figure 6 and Table 2

Emphasis areas are habitats where resistance to invasive annual grasses and resiliency after disturbance are low within and around focal habitats.

Priority Areas for Conservation: Figure 7, Tables 3&4

Focal habitats: Figure 7 and Table 4

Emphasis areas are conifer expansion in association with 75% Breeding Bird Density areas with landscape sagebrush cover greater tjam 25%

Step 1b. Potential Management Strategies and Examples

Management Strategies to Address Wildfires and Invasive Annual Grasses

- Habitat Recovery/Restoration
- Fuels Management
- Fire Operations
- Post-Fire Rehabilitation

Utilize Table 4 in Chambers et al. 2014 to develop management strategies for each Priority Area for Conservation.

Management Strategies to Address Conifer Expansion

- Habitat Recovery/Restoration
- Fuels Management
- Fire Operations
- Post-Fire Rehabilitation

Utilize Table 4 in Chambers et al. 2014 to develop management strategies for each Priority Area for Conservation.

Step 2 – Management Unit Applications for Invasive Annual Grasses and Conifer Expansion

Step 2a

1) Evaluate the accuracy and utility of Step 1 geospatial layers and incorporate relevant local information.
2) Develop framework for incorporating management strategies to initiate implementation/activity plans.

Step 2b

Develop collaborative implementation/activity plans to address threats to focal habitats in Priority Areas for Conservation.

Figure 1, Assessment Flow Chart

Step 1

The first component of the Wildfire and Invasive Annual Grasses Assessment describes the factors that collectively provide the sage-grouse landscape context. Step 1a provides this context by discussing PACs, breeding bird density (BBD), soil temperature and moisture regimes (indicators of resistance to annual grasses and resilience after disturbance), landscape sagebrush cover, and conifer expansion. See Chambers et al. 2014) for a detailed description of Invasive Annual Grass and Wildfire threats to sage-grouse habitat. Priority PACs and focal habitats are derived from the information provided in this sage-grouse landscape context section.

Step 1a- Sage-grouse landscape context

This component of the assessment identifies important PACs and associated focal habitats where wildfire, invasive annual grasses, and conifer expansion pose the most significant threats to sage-grouse.

The primary focus of this assessment is on sage-grouse populations across the WAFWA Management Zones III, IV, and V (**Figure 2**, Current PACs for WAFWA Management Zones III, IV, and V). Sage-grouse are considered a landscape species that require very large areas to meet their annual life history needs. Sage-grouse are highly clumped in their distribution (Doherty et al. 2010), and the amount of landscape cover in sagebrush is an important predictor of sage-grouse persistence in these population centers (Knick et al. 2013). States have used this information combined with local knowledge to identify PACs to help guide long-term conservation efforts. FIAT used data sets that were available across the three management zones as an initial step for prioritizing selected PACs and identifying focal habitats for fire and invasive annual grasses and conifer expansion assessments. These data sets (also described in Chambers et al. 2014) include:

Priority Areas for Conservation (PACs)

PACs have been identified by states as key areas that are necessary to maintain redundant, representative, and resilient sage-grouse populations (USFWS 2013; see Figure 2). A primary objective is to minimize threats within PACs (e.g., wildfire and invasive annual grasses impacts) to ensure the long-term viability of sage-grouse and its habitats. A secondary priority is to conserve sage-grouse habitats outside of PACs since they may also be important for habitat connectivity between PACs (genetic and habitat linkages), habitat restoration and population expansion opportunities, and flexibility for managing habitat changes that may result from climate change. PACs have also been identified by the USFWS as one of the reporting geographic areas that will be considered during listing determinations for sage-grouse.

The combination of PACs with BBD data (described below) assists us in identifying connectivity between populations. PAC boundaries may be modified in the future requiring adjustments in focal habitat areas and management strategy priorities.

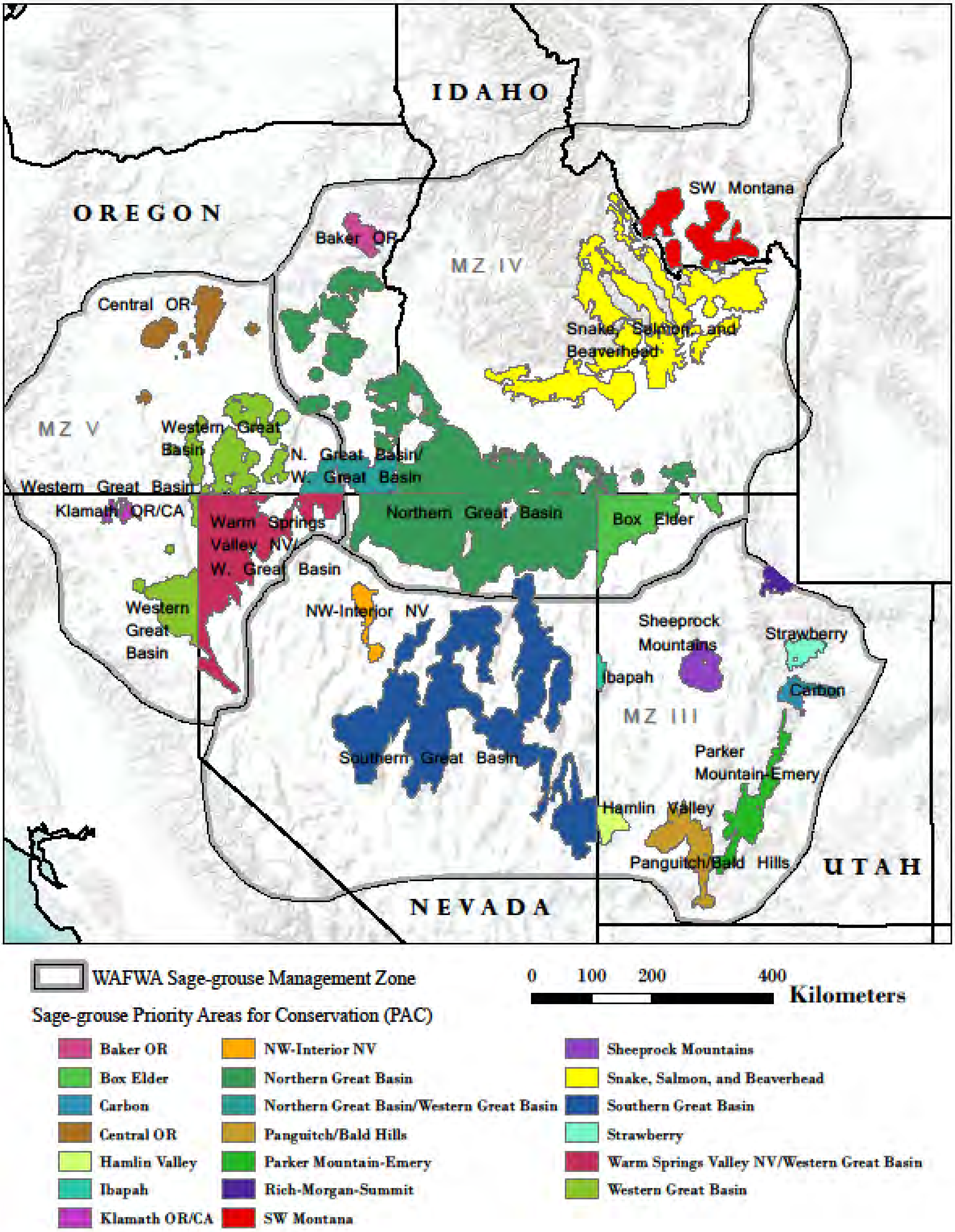


Figure 2, Current PACs for WAFWA Management Zones III, IV, and V. Bi-State sage-grouse populations were not included for this analysis and are being addressed in separate planning efforts.

Breeding Bird Density

Doherty et al. (2010) provided a useful framework for identifying population concentration centers in their range-wide BBD mapping. FIAT used maximum counts of males on leks (4,885 males) to delineate breeding bird density areas that contain 25, 50, 75, and 100 percent of the known breeding population. Leks were then mapped according to abundance values and buffered by 4 to 5.2 miles (6.4 to 8.5 kilometers) to delineate nesting areas. Findings showed that while sage-grouse occupy extremely large landscapes, their breeding distribution is highly aggregated in comparably smaller identifiable population centers; 25 percent of the known population occurs within 3.9 percent (7.2 million acres [2.92 million hectares]) of the species range, and 75 percent of birds are within 27 percent of the species range (50.5 million acres [20.4 million hectares]; Doherty et al. 2010). See **Figures 3**, Sage-Grouse Breeding Bird Density Thresholds.

This analysis places emphasis on breeding habitats because little broad/mid-scale data exists for associated brood-rearing (summer) and winter habitat use areas. Finer scale seasonal habitat use data should be incorporated (or, if not available studies, should be conducted) at local levels to ensure management actions encompass all seasonal habitat requirements. Federal administrative units should consult with state wildlife agencies for additional seasonal habitat information.

For this assessment, FIAT chose to use the 75 percent BBD as an indicator of high bird density areas that informed the approach used by state wildlife agencies to initially identify PACs. Range-wide BBD areas provide a means to further prioritize actions within relatively large PACs to maintain bird distribution and abundance. FIAT used state level BBD data from Doherty et al. (2010) instead of range-wide model results to ensure important breeding areas in Management Zones III, IV, and V were not underweighted due to relatively higher bird densities in the eastern portion of the range. BBD areas of 75 to 100 percent are included in Appendix 1 to provide context for local management units when making decisions concerning connectivity between populations and PACs.

Note that breeding density areas were identified using best available information in 2009, so this range-wide data does not reflect the most current lek count information and changes in conditions since the original analysis. Subsequent analysis should use the most current information available. Also, BBD areas should not be viewed as rigid boundaries but rather as a means to regionally prioritize landscapes where step down assessments and actions should be implemented quickly to conserve the most birds.

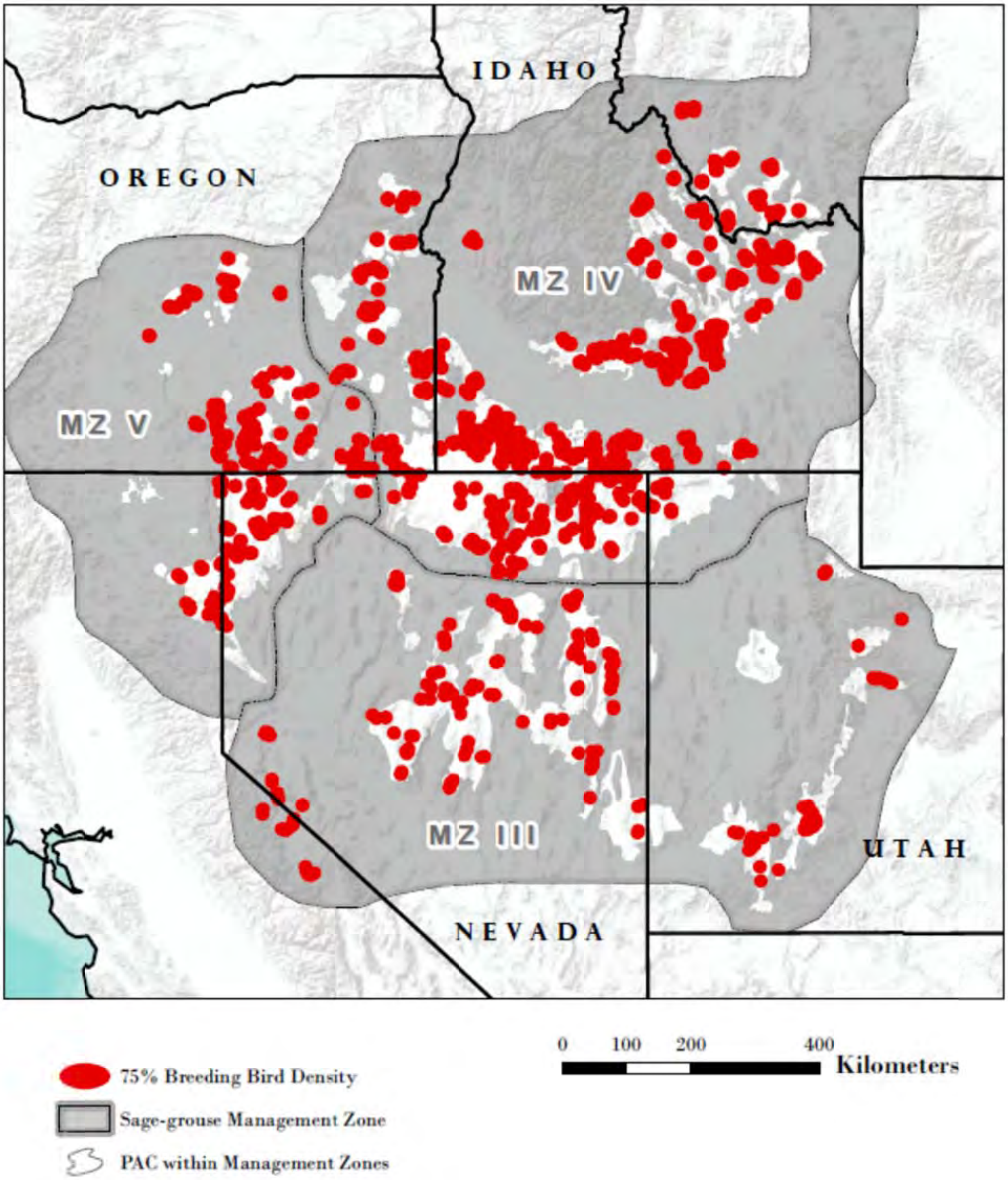


Figure 3, Sage-Grouse Breeding Bird Density Thresholds for 75% of the breeding birds, Management Zones, and PACs. Breeding bird density of 75 to 100% is shown in Appendix 1 to provide context for local management units when making decisions concerning connectivity between populations and PACs.

Soil Temperature and Moisture Regimes

Invasive annual grasses and wildfires can be tied to management strategies through an understanding of resistance and resilience concepts. Invasive annual grasses has significantly reduced sage-grouse habitat throughout large portions of its range (Miller et al. 2011). While abandoned leks were linked to increased nonnative annual grass presence, active leks were associated with less annual grassland cover than in the surrounding landscape (Knick et al. 2013). Invasive annual grasses also increases fire frequency, which directly threatens sage-grouse habitat and further promotes the establishment of invasive annual grasses (Balch et al. 2013). This nonnative annual grass and fire feedback loop can result in conversion from sagebrush shrublands to annual grasslands (Davies 2011).

In cold desert shrublands, vegetation community resistance to invasive annual grasses and resilience following disturbance is strongly influenced by soil temperature and moisture regimes (Chambers et al. 2007; Meyer et al. 2001). Generally, colder soil temperature regimes and moister soil moisture regimes are associated with more resilient and resistant vegetation communities. While vegetation productivity and ability to compete and recover from disturbance increase along a moisture gradient, cooler temperatures limit invasive annual grass growth and reproduction (Chambers et al. 2007; Chambers et al. 2014). Conversely, warm and dry soil temperature and moisture regimes and to a lesser degree cool and dry soil temperature and moisture regimes, are linked to less resistant and resilient communities (see Figure 9 in Chambers et al. 2014). A continuum in resistance and resilience exists between the warm and dry and cool and dry soil temperature and moisture regimes that will need to be considered in Step 2 in developing implementation or activity plans. These relationships can be used to prioritize management actions within sage-grouse habitat using broadly available data.

To capture relative resistance and resilience to disturbance and invasive annual grasses across the landscape, soil temperature and moisture regime information (described in greater detail in Chambers et al. 2014) were obtained from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) data. Where gaps in this coverage existed, the NRCS US General Soil Map (STATSGO2) data was used (Soil Survey Staff 2014; see Appendix 1). The STATSGO2 database includes soils mapped at a 1:250,000-scale; the SSURGO database includes soils mapped at the 1:20,000 scale. Interpretations made from soil temperature and moisture regimes from the STATSGO2 database will not have the same level of accuracy as those made from the SSURGO database.

Areas characterized by warm and dry soil temperature and moisture regimes (low relative resistance and resilience) were intersected with sage-grouse breeding habitat and sagebrush landscape cover to identify candidate areas (emphasis areas) for potential management actions that mitigate threats from invasive annual grasses and wildfire (**Figure 4**, Soil Moisture and Temperature Regimes for Management Zones III, IV, and V, and **Figure 5**, Intersection of High Density (75% BBD) Populations). These data layers provide the baseline information considered important in prioritizing areas where conservation and management actions could be developed to address invasive annual grasses in a scientifically defensible manner (see Table 4 in Chambers et al. 2014).

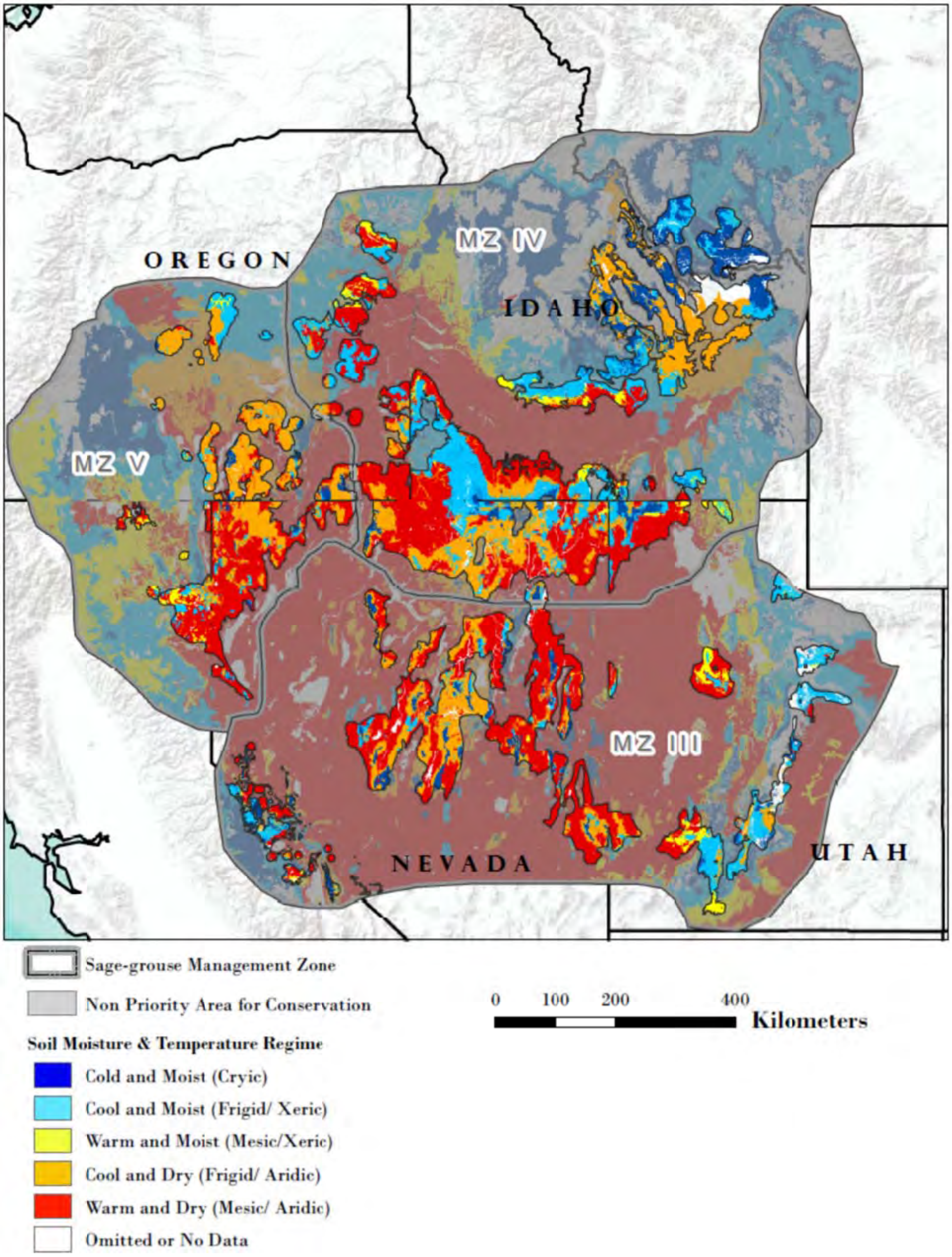


Figure 4, Soil Moisture and Temperature Regimes for Management Zones III, IV, and V

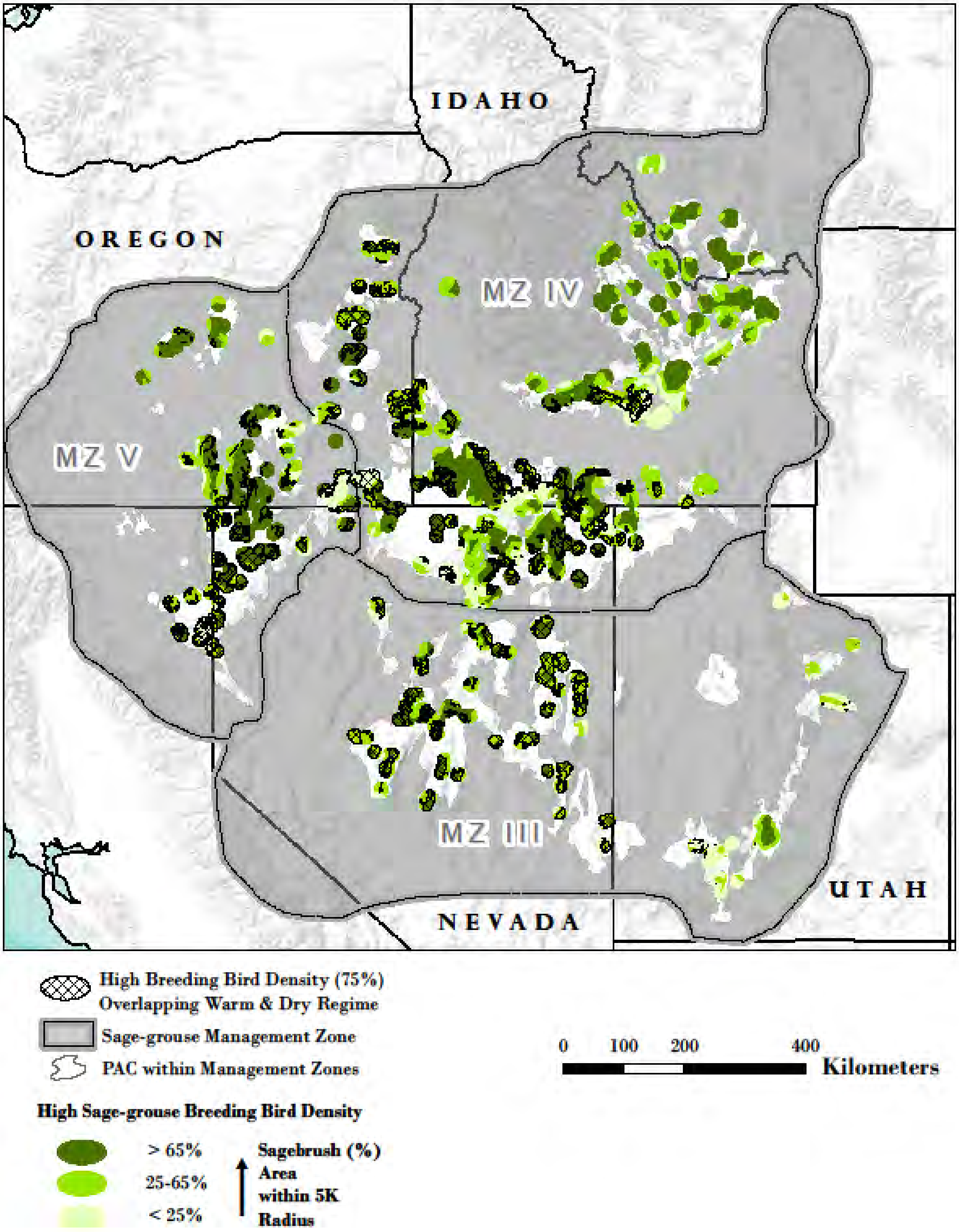


Figure 5, Intersection of High Density (75% BBD) Populations. The warm and dry sites and the proportion of these habitats in the three sagebrush landscape cover classes by management zone, and PACs within the Great Basin.

Sagebrush Landscape Cover

The amount of the landscape in sagebrush cover is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, FIAT used less than or equal to 25 percent sagebrush landscape cover as a level below which there is a low probability of maintaining sage-grouse leks, and greater than or equal to 65 percent as the level above which there is a high probability of sustaining sage-grouse populations with further increases of landscape cover of sagebrush (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Increases in landscape cover of sagebrush have a constant positive relationship with sage-grouse lek probability at between about 25 percent and 65 percent landscape sagebrush cover (Knick et al. 2013). It is important to note that these data and interpretations relate only to persistence (i.e., whether or not a lek remains active), and it is likely that higher proportions of sagebrush cover may be required for population growth.

For the purposes of delineating sagebrush habitat relative to sage-grouse requirements for landscape cover of sagebrush, FIAT calculated the percentage of landscape sagebrush cover (Landfire 2013) within a 3-mile (5-kilometer) radius of each 98-foot by 98-foot (30 meter by 30 meter) pixel in Management Zones III, IV, and V (see Appendix 2 in Chambers et al. 2014) for how landscape sagebrush cover was calculated). FIAT then grouped the percentage of landscape sagebrush cover into each of the selected categories (0 to 25 percent, 25 to 65 percent, 65 to 100 percent; **Figure 6**, Sagebrush Landscape Cover and Fire Perimeters for the Analysis Area). Landfire data was based on 2000 satellite imagery so wildfire perimeters after that date were incorporated into this layer to better reflect landscape sagebrush cover. Burned areas were assumed to fall into the 0 to 25 percent landscape cover class.

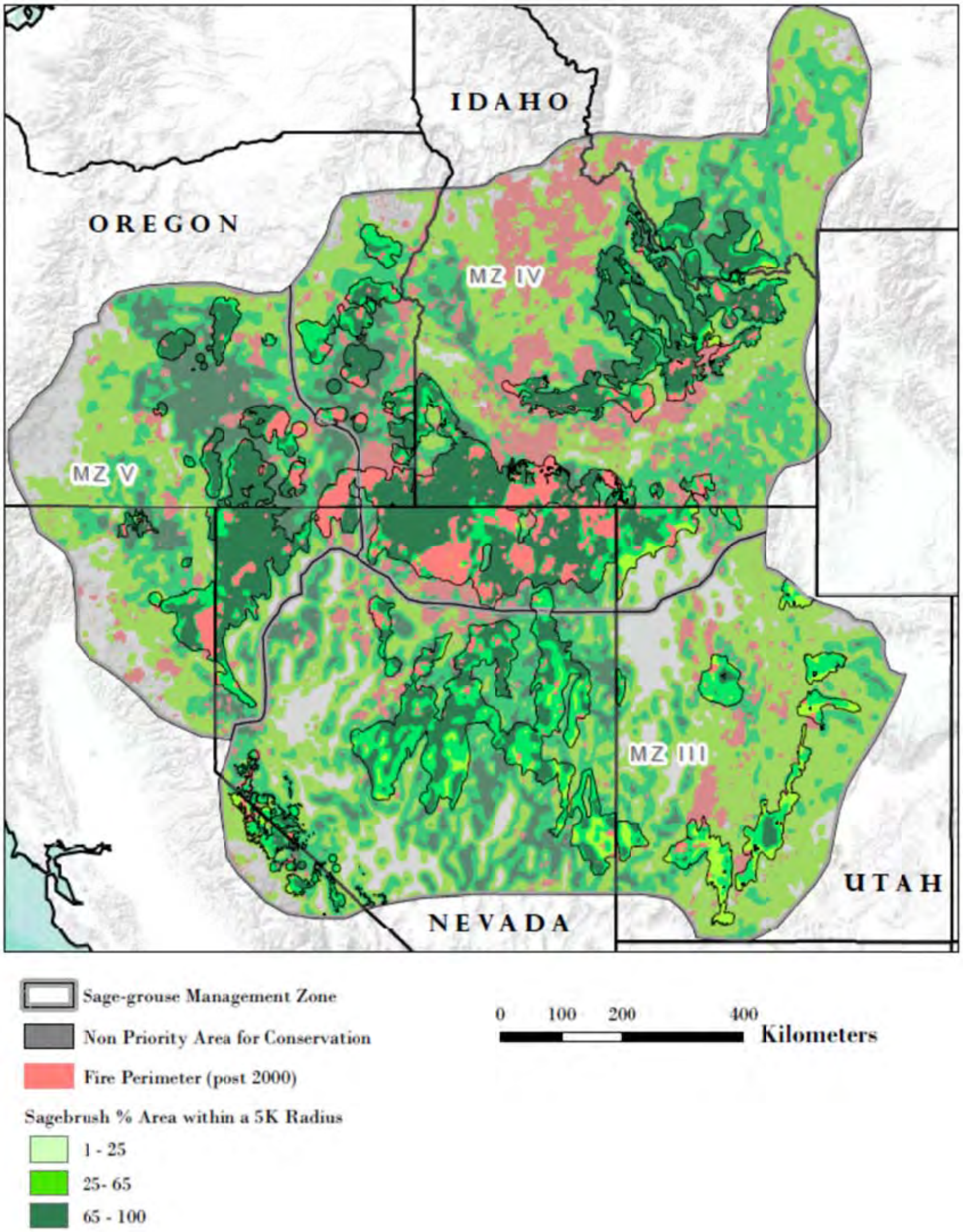


Figure 6, Sagebrush Landscape Cover and Fire Perimeters (post-2000) for the Analysis Area

Conifer Expansion

Conifer expansion into sagebrush landscapes also directly reduces sage-grouse habitat by displacing shrubs and herbaceous understory as well as by providing perches for avian predators. Conifer expansion also leads to larger, more severe fires in sagebrush systems by increasing woody fuel loads (Miller 2013). Sage-grouse populations have been shown to be impacted by even low levels of conifer expansion (Baruch-Mordo et al. 2013). Active sage-grouse leks persist in regions of relatively low conifer woodland and are threatened by conifer expansion (Baruch-Mordo et al. 2013; Knick et al. 2013).

To estimate where sage-grouse breeding habitat faces the largest threat of conifer expansion, FIAT used a risk model developed by Manier et al. (2013) that locates regions where sagebrush landscapes occur within 250 meters of conifer woodland (**Figure 7**, Modeled Conifer Expansion for PACs with Greater Than 25% Sagebrush Landscape Cover In and Around 75% BBD). Although the model is coarse, it is available for the entirety of the three sage-grouse management zones analyzed. FIAT encourages using more accurate conifer expansion data in Step 2.

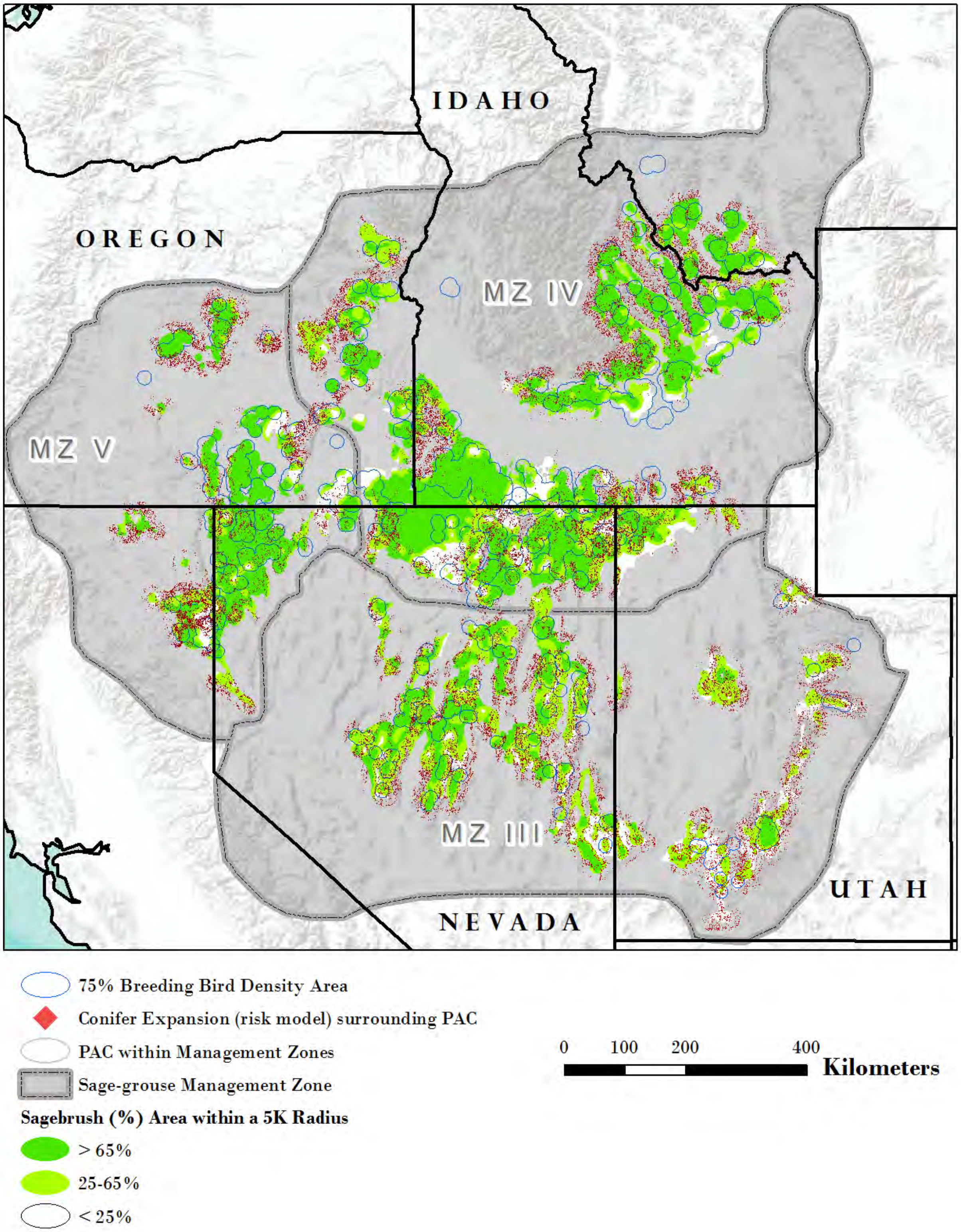


Figure 7, Modeled Conifer Expansion for PACs with Greater Than 25% Sagebrush Landscape Cover In and Around 75% BBD

Step 1a. Identifying PACs and focal habitats

A primary goal for the conservation of sage-grouse populations is the identification of important habitats needed to ensure the persistence and recovery of the species. Loss of habitat, and by inference populations, in these habitats would likely imperil the species in the Great Basin. The first objective is to protect and restore those habitats that provide assurances for retaining large well connected populations.

PACs and the 75 percent BBD maps were used to provide a first-tier stratification (e.g., focal habitats) for prioritizing areas where conservation actions could be especially important for sage-grouse populations. Although these areas are a subset of the larger sage-grouse habitats, they are readily identifiable and include habitats (e.g., breeding and nesting habitats that are considered critical for survival; Connelly et al. 2000; Holloran et al. 2005; Connelly et al. 2011) and necessary for the recovery of the species across its range.

The prioritization of habitats for conservation purposes was based on the several primary threats to remaining sage-grouse populations in the Great Basin including the loss of sagebrush habitats to wildfire and invasive annual grasses, and conifer expansion. The first, and probably the most urgent threat for sage-grouse, is the loss of sagebrush habitat due to wildfire and invasive annual species (e.g., cheatgrass; See Figure 11 in Chambers et al. 2014). Areas of highest concern are those with low resistance to cheatgrass and low resilience after disturbance (warm/dry and some cool/dry temperature and moisture regimes sites) that are either **within or in close proximity** to remaining high density populations of sage-grouse (Figure 5). Sagebrush habitats (greater than 25 percent sagebrush landscape cover) prone to conifer expansion, particularly pinyon pine and/or juniper, are also a management concern when within or adjacent to high density sage-grouse populations (Figure 7).

Because these two threats occur primarily at different points along an elevational gradient and are associated with different soil temperature and moisture regimes, separate approaches are used to select PACs and focal habitats for each.

High Density Populations at Highest Risk from <u>Wildfire and Invasive Annual Grasses</u>

PACs in Management Zones III, IV, and V. were evaluated on the basis of high density (75 percent) BBDs, sagebrush landscape cover, and soil temperature and moisture regimes to identify initial PACs that are a priority for assessments and associated focal habitats. **Figure 8**, High Priority PACs with High Density Sage-Grouse Populations (75% BBD), displays the results of the analysis focusing on the intersection of high density (75 percent BBD) populations, the warm and dry sites, and the proportion of these habitats in the three sagebrush landscape cover classes by management zone, and PACs within the Great Basin. **Table 1**, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Warm/ Dry Sites, and Percentage of Habitat in Sagebrush Landscape Cover Classes, displays quantitative outputs of this analysis. The table allows a comparison of these data, and assists in selecting five PACs that provide the greatest contribution to high density sage-grouse populations, and the amounts (acres and proportion) within those PACs of sagebrush cover classes associated with warm and dry soil temperature and moisture regimes.

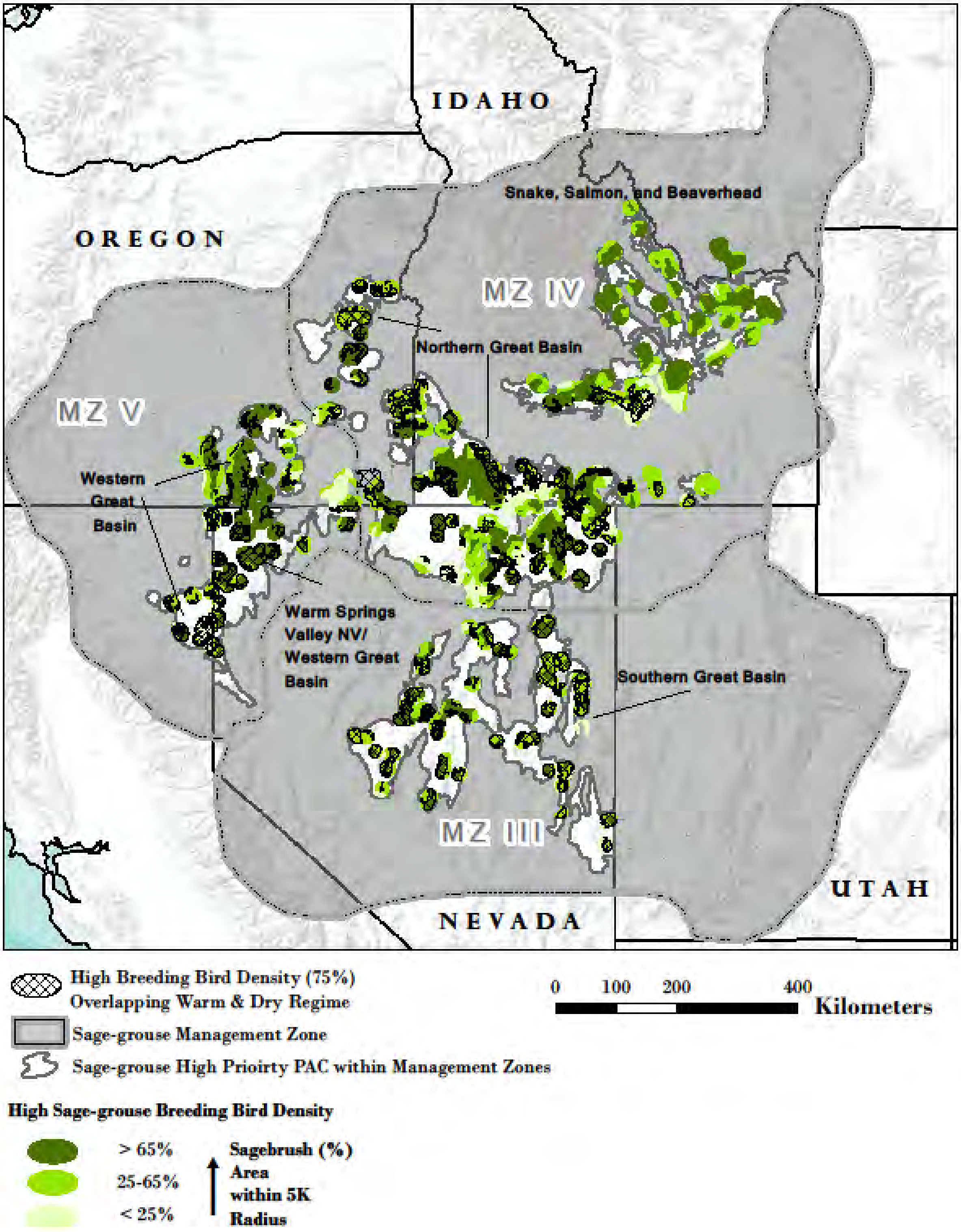


Figure 8, High Priority PACs with High Density Sage-Grouse Populations (75% BBD) sagebrush landscape cover classes, and areas with low resistance and resilience relative to wildfires and invasive annual species.

Table 1, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Warm/ Dry Sites, and Percentage of Habitat in Sagebrush Landscape Cover Classes

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	Total PAC Acres	Breeding Bird Density (75%) Acres	Percent of Breeding Bird Density (75%) Area within PAC	Warm and Dry Soil Moisture & Temperature Regime within Breeding Bird Density (75%) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	57%	179551 (2%)	674554 (9%)	1745163 (24%)
3	Southern Great Basin	9461355	3146056	33%	42596 (1%)	792780 (25%)	1062091 (34%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	52%	68107 (2%)	89146 (3%)	95970 (3%)
5	Western Great Basin	3177253	2084626	66%	149399 (7%)	140141 (7%)	202767 (10%)
5	Warm Springs Valley NV/Western Great Basin	3520937	1558166	44%	31458 (2%)	207365 (13%)	741353 (48%)
4	SW Montana	1369076	659475	48%	0 (0%)	0 (0%)	0 (0%)
4	Northern Great Basin/Western Great Basin	1065124	624581	59%	114222 (18%)	85258 (14%)	116513 (19%)
5	Central OR	813699	451755	56%	0 (0%)	6211 (1%)	16463 (4%)
3	Panguitch/Bald Hills	1135785	352258	31%	6883 (2%)	5821 (2%)	0 (0%)
3	Parker Mountain-Emery	1122491	308845	28%	0 (0%)	127 (0%)	0 (0%)
4	Box Elder	1519454	292658	19%	22 (0%)	43325 (15%)	23913 (8%)
4	Baker OR	336540	184813	55%	0 (0%)	46459 (25%)	36214 (20%)
3	NW-Interior NV	371557	108256	29%	576 (1%)	17117 (16%)	25173 (23%)
3	Carbon	355723	97734	27%	255 (0%)	180 (0%)	0 (0%)
3	Strawberry	323219	52635	16%	0 (0%)	0 (0%)	0 (0%)
3	Rich-Morgan-Summit	217033	37005	17%	0 (0%)	0 (0%)	0 (0%)
3	Hamlin Valley	341270	3244	1%	0 (0%)	139 (4%)	3105 (96%)
3	Ibapah	98574	0	0%	0 (NA)	0 (NA)	0 (NA)
3	Sheeprock Mountains	611374	0	0%	0 (NA)	0 (NA)	0 (NA)
5	Klamath OR/CA	162667	0	0%	0 (NA)	0 (NA)	0 (NA)

* Numbers in parenthesis indicate the percent of acres relative to total acres of breeding bird density (75%)

These five PACs comprise 90 percent and 95 percent of remaining PAC sagebrush landscape cover in the 25 to 65 percent and greater than or equal to 65 percent sagebrush landscape cover classes, respectively, of the 75 percent BBD associated with low resistance/resilience habitats. The 75 percent BBD habitats in the Northern, Southern Great Basin, and Warm Spring PACs appear particularly important for two reasons. They represent a significant part of the remaining habitats for the Great Basin metapopulation, and they have the greatest amount of low resiliency habitat remaining that still functions as sage-grouse habitat.

An examination of the 5 selected PACs shows that the sum of the 75 percent BBD within these PACs is 16,995,496 acres (**Table 2**, PACs with the Highest Acres and Proportions of 75% BBD acres, and Acres and Proportions of 75% BBD Acres within the Warm/Dry Soil Temperature and Moisture Class). These are the **focal habitats**. These five PACs constitute 84 percent of the 75 percent BBD low resiliency habitats for all Management Zones III, IV, and V PACs. Within and immediately around these focal habitats, 5,751,293 acres are in high BBD areas with landscape sagebrush cover in the 25-65 percent and ≥ 65 percent classes and in the warm and dry soil temperature and moisture regimes. These are the habitats in the most danger to loss due to their low resistance to invasive annual grasses and low resilience following wildfire. Within the focal habitats in the high priority PACs, low resistance and resilience areas (cross-hatched areas in Figure 8) are a high priority (emphasis area) for implementing management strategies. Applying management strategies outside the emphasis areas are appropriate if the application of fire operations and fuels management activities will be more effective in addressing wildfire threats.

Table 2, PACs with the Highest Acres and Proportions of 75% BBD acres, and Acres and Proportions of 75% BBD Acres within the Warm/Dry Soil Temperature and Moisture Class (see Figure 8)

PAC	PAC Acres	Acres of 75% BBD in PAC (**focal habitat**)	Proportion of 75% BBD within PACs	Warm & Dry Soils within 75% BBD by Sagebrush Landscape Cover Classes Greater Than 25%*	
				25-65%	>65%
Northern Great Basin	13,045,515	7,383,442	0.57	674,517(9%)	1,745,163(24%)
Southern Great Basin	9,461,355	3,146,056	0.33	792,780(25%)	1,062,091(34%)
Snake, Salmon, and Beaverhead	5,477,014	2,823,205	0.52	89,146(3%)	95,970(3%)
Warm Springs Valley NV/Western Great Basin	3,520,937	1,558,166	0.44	207,365(13%)	741,353(48%)
Western Great Basin	3,177,253	2,084,626	0.66	140,141(7%)	202,767(10%)
Total for 5 PACS	**34,682,074**	**16,995,496**	**0.49**	**1,903,949**	**3,847,344**

***** This category represents the emphasis areas for applying appropriate management strategies in or near the focal habitats due to the lower probability of recovery after disturbance and higher probability of invasive annual grasses and existing wildfire threats.

High Density Sage-Grouse Habitats at Risk from Conifer Expansion

PACs, sagebrush landscape cover, and the 75 percent BBD data were also used in conjunction with the conifer expansion data (Mainer et al. 2013) to provide an initial stratification to determine PACs where conifer removal would benefit important sagebrush habitats. Conifer expansion threats are primarily western juniper in the northern Great Basin and pinyon pine/Utah juniper in the southern Great Basin.

Figure 7 displays results of the analysis focusing on the intersection of the 75 percent BBD, and modeled conifer expansion areas within two sagebrush landscape cover classes by management zone and PACs within the Great Basin. To identify high density sage-grouse areas affected by conifer expansion, the amount and proportion of acres estimated to be affected were calculated by sagebrush cover class to assist in the identification of the focal habitats (**Table 3)**. **Table 4**, displays quantitative outputs of this analysis using the 25 to 65 percent and greater than 65 percent landscape sagebrush cover classes for the PACs. Thus, **focal habitats** for addressing conifer expansion are the areas within and near conifer expansion in sagebrush landscape cover classes of 25 to 65 percent and greater than 65 percent. Conifer expansion in these two sagebrush landscape cover classes in the 75 percent BBD areas constitutes an emphasis area for treatments to address conifer expansion. Landscapes with less than 25 percent sagebrush cover may require significant additional management actions to restore sagebrush on those landscapes and therefore were considered a lower priority for this analysis. Focal habitats are identified in Table 4 and displayed in **Figure 9**.

Table 3 assists in identifying those PACs that provide the greatest contribution to high density sage-grouse populations, and the amounts (acres and proportion) within those PACs of sagebrush cover classes associated with modelled conifer expansion areas. Although there are uncertainties associated with the model, the results help managers identify specific geographic areas where treatments in conifer (pinyon and/or juniper) could benefit existing important sage-grouse populations.

The results of the screening revealed 5 PACs that contribute substantially to the 75 percent BBD habitats and are currently impacted most by conifer expansion (primarily pinyon pine and/or juniper; Table 4 and Figure 9). Four of the five PACs identified as high priority for conifer expansion treatments were also high priorities for wildfires and invasive annual grass threats. This is likely due to the size of the PACs and the relative importance of these PACs for maintaining the Great Basin sage-grouse meta-populations. As expected, the locations of high density sage-grouse habitats affected by conifer expansion differ spatially from those associated with low resilience habitats within and among the PACs, primarily due to differences in the biophysical settings (e.g., elevation and rainfall) that contribute to threats from invasive annual grasses and wildfires.

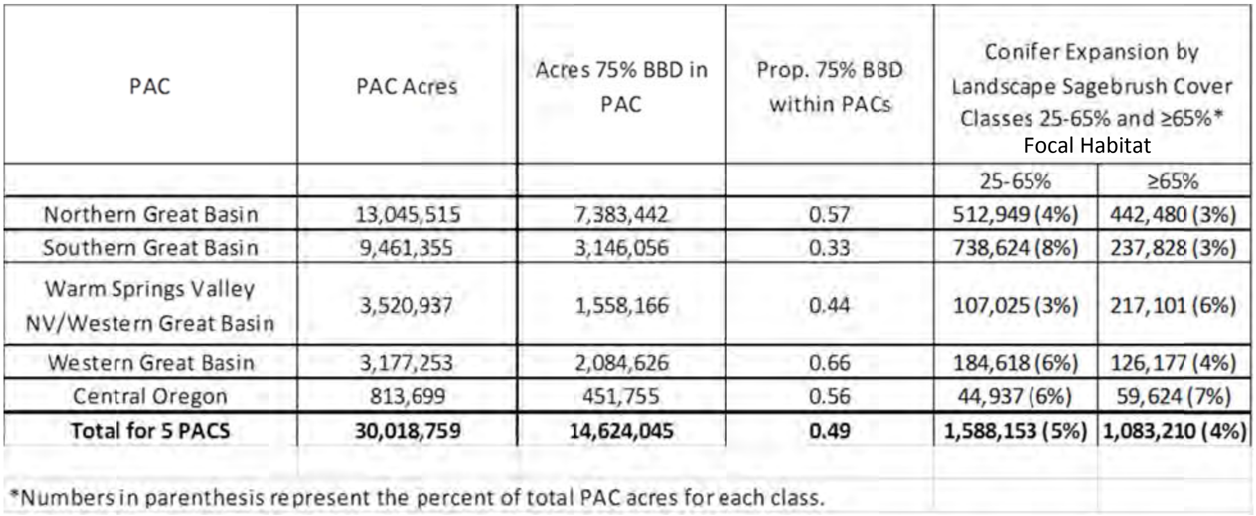
Three PACs (Snake/Salmon/Beaverhead, Southwest Montana, and Northern Great Basin/Western Great Basin) ranked high due to their relatively large proportion of high density breeding habitats (Table 3), but were not selected since the threat of conifer expansion was relatively low. One PAC, (Snake/Salmon/Beaverhead, was identified as a potential high priority area but was dismissed because results of the conifer expansion model likely overestimated impacts due to the adjacent conifer forests in this region. The COT Report also identified conifers as a "threat present but localized" in these areas, whereas, the top five PACs prioritized all have conifers identified as a widespread priority threat to address (USFWS 2013).

Table 3, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Modeled Conifer Expansion, and Percentage of Habitats in Sagebrush Landscape Cover Classes

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	PAC acres	Breeding Bird Density (75%) Acres	Relative Proportion of Breeding Bird Density Area within PAC	Conifer Expansion (Modeled) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	0.57	188502 (1%)	512949 (4%)	442480 (3%)
3	Southern Great Basin	9461355	3146056	0.33	108657 (1%)	738624 (8%)	237828 (3%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	0.52	4209 (0%)	92173 (2%)	216803 (4%)
5	Western Great Basin	3177253	2084626	0.66	87963 (3%)	184618 (6%)	126177 (4%)
5	Warm Springs Valley NV/Western Great I	3520937	1558166	0.44	37148 (1%)	107025 (3%)	217101 (6%)
4	SW Montana	1369076	659475	0.48	1428 (0%)	34765 (3%)	39215 (3%)
4	Northern Great Basin/Western Great Bas	1065124	624581	0.59	12101 (1%)	2247 (0%)	6161 (1%)
5	Central OR	813699	451755	0.56	3191 (0%)	44937 (6%)	59624 (7%)
3	Panguitch/Bald Hills	1135785	352258	0.31	89141 (8%)	75157 (7%)	2563 (0%)
3	Parker Mountain-Emery	1122491	308845	0.28	84719 (8%)	83441 (7%)	7469 (1%)
4	Box Elder	1519454	292658	0.19	8531 (1%)	114376 (8%)	57645 (4%)
4	Baker OR	336540	184813	0.55	945 (0%)	15263 (5%)	195 (0%)
3	NW-Interior NV	371557	108256	0.29	7929 (2%)	29440 (8%)	11813 (3%)
3	Carbon	355723	97734	0.27	15968 (4%)	34446 (10%)	283 (0%)
3	Strawberry	323219	52635	0.16	7916 (2%)	27340 (8%)	1075 (0%)
3	Rich-Morgan-Summit	217033	37005	0.17	11685 (5%)	14280 (7%)	238 (0%)
3	Hamlin Valley	341270	3244	0.01	11321 (3%)	29960 (9%)	6243 (2%)
3	Ibapah	98574	0	0.00	195 (0%)	6770 (7%)	1039 (1%)
5	Klamath OR/CA	162667	0	0.00	1 (0%)	1533 (1%)	15302 (9%)
3	Sheeprock Mountains	611374	0	0.00	16744 (3%)	78580 (13%)	11878 (2%)

* Numbers in parenthesis indicate the proportion of acres relative to total PAC acres

Table 4, PACS with the Highest Acres and Proportions of 75% BBD acres and Estimated Conifer Expansion within Sagebrush Landscape Cover Classes (25-65 percent and ≥65 percent; see Figure 9)



PAC	PAC Acres	Acres 75% BBD in PAC	Prop. 75% BBD within PACs	Conifer Expansion by Landscape Sagebrush Cover Classes 25-65% and ≥65%* Focal Habitat	
				25-65%	≥65%
Northern Great Basin	13,045,515	7,383,442	0.57	512,949 (4%)	442,480 (3%)
Southern Great Basin	9,461,355	3,146,056	0.33	738,624 (8%)	237,828 (3%)
Warm Springs Valley NV/Western Great Basin	3,520,937	1,558,166	0.44	107,025 (3%)	217,101 (6%)
Western Great Basin	3,177,253	2,084,626	0.66	184,618 (6%)	126,177 (4%)
Central Oregon	813,699	451,755	0.56	44,937 (6%)	59,624 (7%)
Total for 5 PACS	**30,018,759**	**14,624,045**	**0.49**	**1,588,153 (5%)**	**1,083,210 (4%)**

*Numbers in parenthesis represent the percent of total PAC acres for each class.

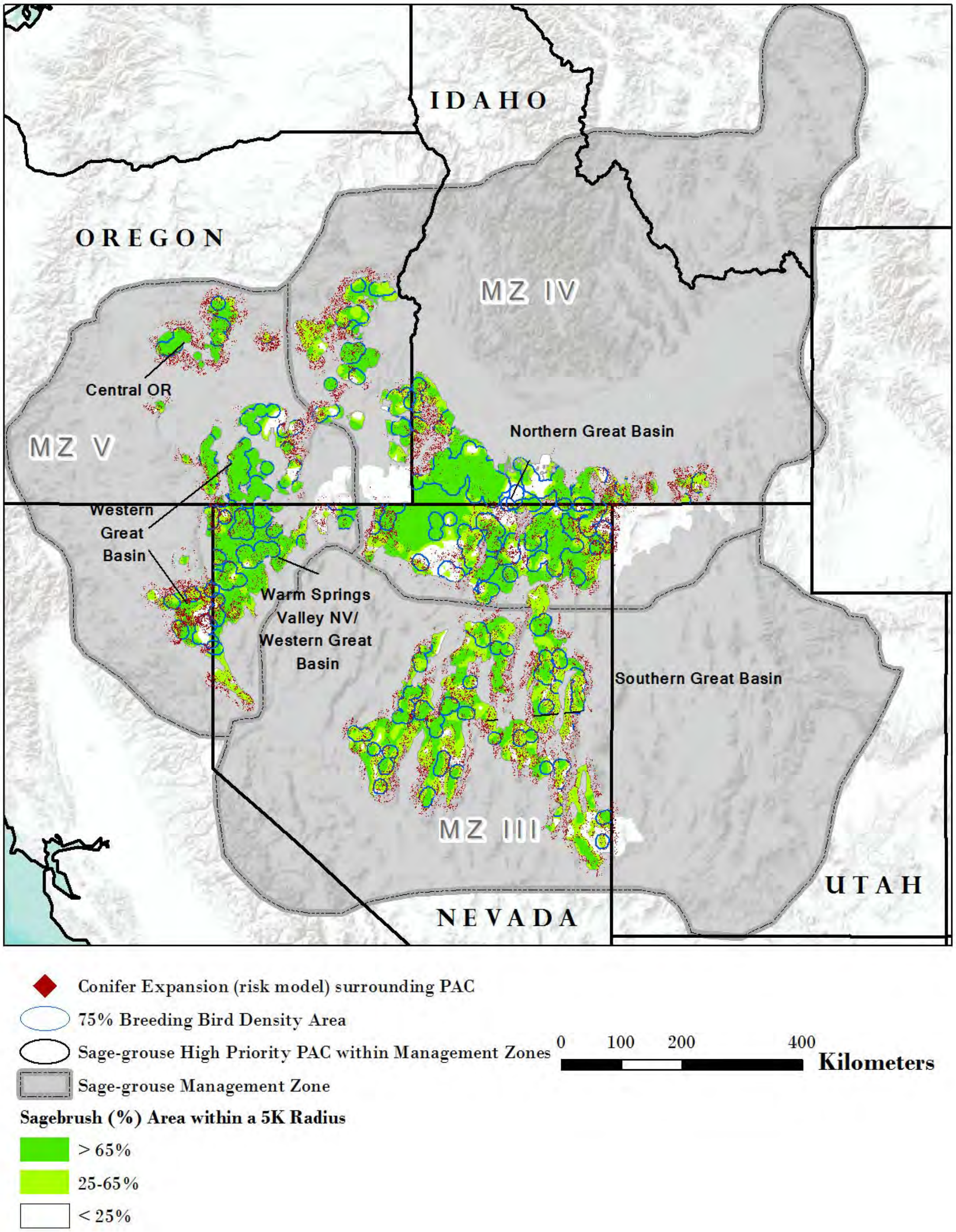


Figure 9, Five PACs Significantly Impacted by Conifer Expansion that contribute substantially to the 75% BBD and that have sagebrush landscape cover greater than 25%.

While the coarse-scale conifer expansion data used in this analysis likely over estimates the extent of the pinyon pine and/or juniper threat, results suggest that far fewer acres are currently affected by conifers than might be at risk from fire and invasive annual grasses impacts. Conifer expansion into sage-grouse habitats occurs at a slower rate, allowing more time for treatment, but early action may be needed to prevent population level impacts on sage-grouse (Baruch-Mordo et al. 2013). Furthermore, conifer expansion is primarily occurring on cooler and moister sites that are more resilient and where restoration is more likely to be effective (Miller et al. 2011), providing managers the opportunity to potentially offset at least some habitat loss expected to continue in less resilient ecosystems. While the available data set used to estimate conifer expansion provides only a coarse assessment of the problem, considerable efforts are currently underway to map conifers across sage-grouse range. These maps are expected to be available in the near future and should be used by land managers to better target project level conifer removal.

FIAT cautions against using the plotted locations of estimated conifer expansion for local management decisions due to the coarse-scale nature of this range-wide data set. Conifer expansion estimates are primarily provided here to aid in judging the relative scope of the threat in each PAC.

Step 1b. Potential Management Strategies

Potential management **strategies** (e.g., fuels management, habitat recovery/restoration, fire operations, post-fire rehabilitation) to conserve or restore Step 1 focal habitats are described below to assist local management units to initiate Step 2. These examples are illustrative and do not contain the full range of management strategies that may be required to address wildfires, invasive annual grasses, and conifer expansion within PACs and associated focal habitats. In general, the priority for applying management strategies is to first maintain or conserve intact habitat and second to strategically restore habitat (after a wildfire or proactively to reconnect habitat). Management strategies will differ when applying the protocol to:

Wildfire and Invasive Annual Grass. (See PACs identified in Table 2 and focal habitats shown in Figure 8). Focal habitats, as they relate to wildfires and invasive annual grasses, are defined as sage-grouse habitat in priority PACs within 75 percent BBD. Within these focal habitats, sagebrush communities with low resilience to disturbance and resistance to invasive annual grasses (warm and dry soil temperature and moisture regimes) are an emphasis area for management actions. Appendix 5 (A) in Chambers et al. 2014) includes a generalized state and transition model with an invasive annual grass component and warm and dry soil temperature and moisture regime associated with 8 to 12 inches of annual precipitation. This state and transition models is useful in developing management strategies to deal with annual grass issues as it contains useful restoration pathways.

Burn Probability is another tool that can be used to assist managers to identify the relative likelihood of large fire occurrence across the landscape within PACs and focal habitats. Burn probability raster data were generated by the Missoula Fire Lab using the large fire simulator - FSim - developed for use in the national Interagency **Fire Program Analysis (FPA)** project. FSim uses historical weather data and LANDFIRE fuel model data to simulate fires burning. Using these simulated fires, an overall burn probability is returned by FSim for each 270m pixel. The burn probability data was overlaid spatially with PACs, soil data, and shrub cover data. The majority of the high and very high burn probability acres lie within the top 5 PACs and are within areas with >25% sagebrush cover. Several of the other PACs have a greater overall percentage of the warm/dry soil regime with high/very high burn probability (northern great basin, baker, and NW interior NV) but the total acres are relatively few. Areas identified with high and very high burn probability are most likely to experience large fires given fire history, fuels, weather and topography. Results are displayed in the table 5 and Figure 10.

Table 5, Percentages of sage-grouse PAC areas with high and very high burn probability, 75% BBD within PAC, 75% BBD and warm dry/temperature regime, and 75% BBD and warm dry/temperature and warm dry/temperature with high and very high burn probability.

Sage Grouse Mangement Zone	*Sage-grouse Priority Area for Conservation (PAC) Name*	*Total PAC Acres*	*High, very high burn probability (percent of PAC acres)*	*75% BBD within PAC (percent PAC acres)*	*75% BBD and warm and dry soil/temperature regime ~~acres~~ (percent PAC acres)*	*75% BBD and warm and dry soil/temperature regime with high, very high burn probability (percent PAC acres)*
4	Northern Great basin	13,045,415	86%	57%	19%	17%
3	Southern Great Basin	9,461,355	48%	33%	20%	9%
4	Snake, Salmon, and Beaverhead	5,477,014	68%	52%	5%	4%
5	Western Great Basin	3,177,253	61%	66%	15%	12%
5	Warm Springs Valley /Western Great Basin	3,520,937	30%	44%	28%	9%
4	SW Montana	1,369,076	1%	48%	0%	0%
4	Northern Great Basin/Western Great Basin	1,065,124	82%	59%	30%	22%
5	Central Oregon	813,699	71%	56%	3%	2%
3	Panguitch/Bald Hills	1,135,785	70%	31%	1%	1%
3	Parker Mountain-Emery	1,122,491	28%	28%	0%	0%
4	Box Elder	1,519,454	61%	19%	4%	2%
4	Baker Oregon	336,540	74%	55%	25%	21%
3	NW-Interior NV	371,557	99%	29%	12%	11%
3	Carbon	355,723	22%	27%	0%	0%
3	Strawberry	323,219	26%	16%	0%	0%
3	Rich-Morgan-Summit	217,033	79%	17%	0%	0%
3	Hamlin Valley	341,270	60%	1%	1%	0%
3	Ibapah	98,574	0%	0%	0%	0%
3	Sheeprock Mountains	611,374	98%	0%	0%	0%
5	Klamath OR/CA	162,667	98%	0%	0%	0%

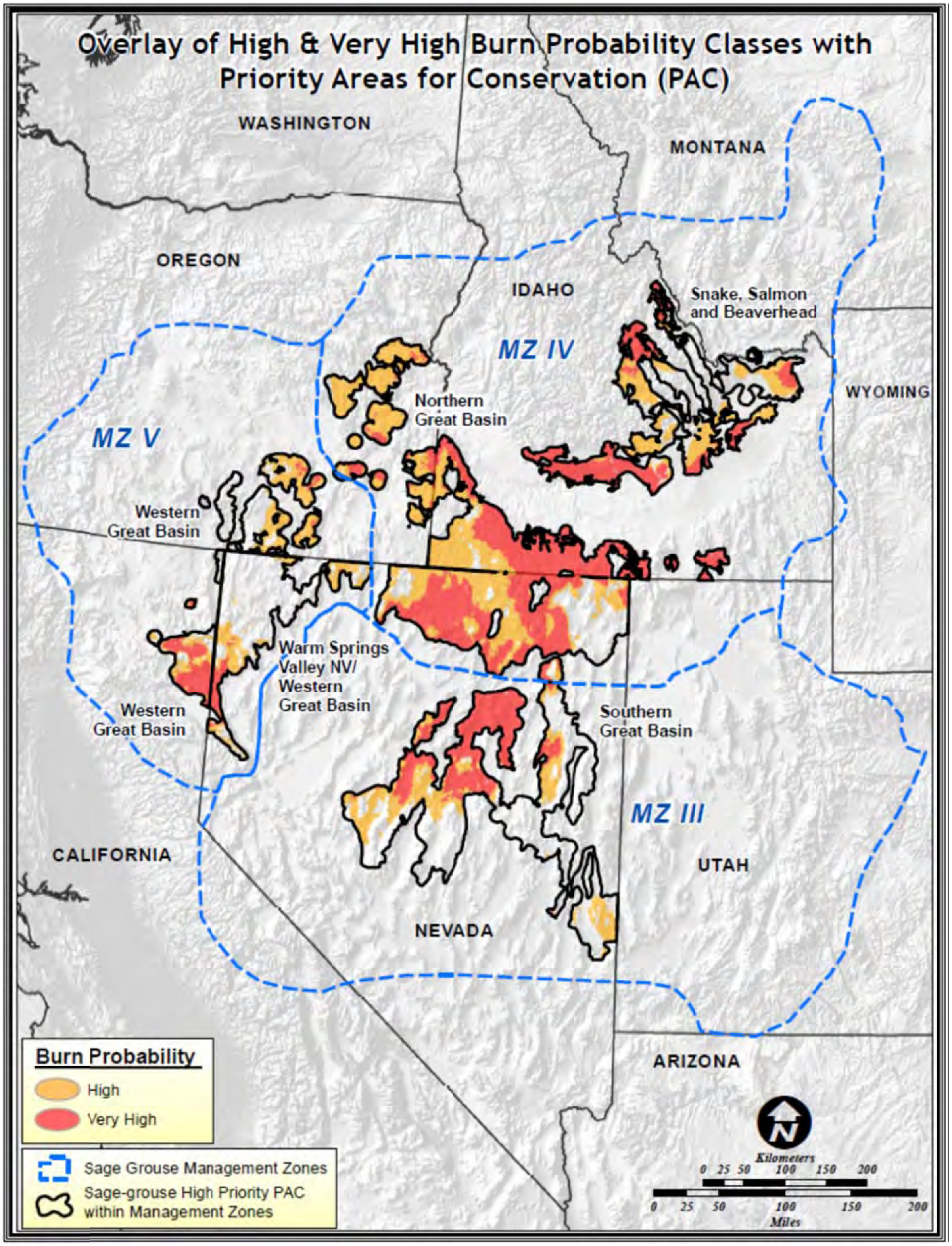


Figure 10, Burn Probability (high and very high) in priority invasive annual grass and wildfire PACs. .

Conifer Expansion. (See priority PACs for assessment identified in Table 4 and focal habitats shown in Figure 9). Focal habitats, as they relate to conifer expansion, are defined as sage-grouse habitat in a priority PAC with sagebrush landscape cover between 25 and 100 percent that is either near or in a conifer expansion area. The relationship between conifer expansion and resilience to disturbance and resistance to expansion is not documented to the same degree as with invasive annual grasses. However, Appendix 5 (D. and E.) in Chambers et al. 2014) includes two generalized state and transition models for conifer expansion with warm to cool and soil temperature regimes associated with precipitation ranges from 12 to 14 or more inches of annual precipitation. These state and transition models are useful in developing management strategies to deal with conifer expansion as they contain useful restoration pathways.

Chambers et al. 2014) is recommended for review at this point for information on applying resistance and resilience concepts along with sage-grouse habitat characteristics to develop management strategies to address wildfires, invasive annual grasses, and conifer expansion. The following tables are recommended for use in developing management strategies in or near focal habitats:

> Table 1. Soil temperature and moisture regimes relationship to vegetation types and resistance and resilience.
> Table 2. Sage-grouse habitat matrix showing the relationship between landscape sagebrush cover and resistance and resilience.
> Table 3. Potential management strategies based on sage-grouse habitat requirements and resistance and resilience.
> Table 4. Management strategies (fire suppression, fuels management, post-fire rehabilitation, and habitat restoration) associated with each cell in the sage-grouse habitat matrix (Table 2).

The "Putting it all together" section of the Chambers et al. 2014) also contains a case study from Northeast Nevada illustrating applications of management strategies to address the conservation, protection, and restoration of sage-grouse habitat.

To further assist in understanding Step 1b, examples of general priorities for management strategies are provided below and illustrated in Appendix 3 and 4:

1. Fuels Management: Projects that are designed to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity.
    a. Identify priorities and potential measures to reduce the threats to sage-grouse habitat resulting from changes in invasive annual grasses (primary focus on exotic annual grasses and conifer encroachment) and wildland fires. Place high priority on areas dominated by invasive annual grasses that are near or adjacent to low resistance and resilience habitats that are still intact.
    b. Areas on or near perimeter of successful post-fire rehabilitation and habitat restoration projects where threats of subsequent fire are present are important for consideration.

    c. Fuels management can be a high priority in large tracts of intact sagebrush if impacts on sage-grouse populations are minimal and outweighed by the potential benefits of reduced wildfire impacts in area being protected.

2. Habitat Recovery/Restoration Recovery (passive restoration) is a high priority in intact sagebrush stands to improve resistance and resilience before a disturbance. For example, where understory perennial herbaceous species are limited, improved livestock grazing practices can increase the abundance of these species and promote increased resistance to annual grasses.
    a. Habitat restoration is important where habitat connectivity issues are present within focal habitats.
    b. Pinyon pine and/or juniper removal in Phase I and II stands adjacent to large, contiguous areas of sagebrush (greater than 25 percent sagebrush landscape cover) is a priority.

3. Fire Operations (includes preparedness, prevention and suppression activities).
    a. Higher priority should be placed on areas with greater than 65 percent cover than on areas with 25 to 65 percent cover, followed by 0 to 25 percent cover (these categories are continuums not discrete thresholds).
    b. Higher priority should be placed on lower resistance/resilience habitats compared with higher resistance/resilience habitats.
    c. Fire operations in areas restored or post-fire rehabilitation treatment where subsequent wildfires can have detrimental effect on investment and recovery of habitat are important for consideration.
    d. Fire operations (suppression) are especially important in low elevation winter sagebrush habitat with low resistance and resiliency.
4. Post-Fire Rehabilitation
    a. High priority should be placed on supporting short-term natural recovery and long-term persistence in higher resistance and resiliency habitats (with appropriate management applied).
    b. High priority should be placed on reseeding in moderate to low resistance and resiliency habitats, but only if competition from invasive annual grasses, if present, can be controlled prior to seeding.

Step 2

Step 2 is carried out by local management units using the Step 1 geospatial data, focal habitats, and the associated management strategies. Step 2 includes evaluating the availability and accuracy of local information and geospatial data used to develop local management strategies in or near focal habitats (Step 2a).

It also involves developing focal habitat activity/implementation plans that include prioritized management tactics and treatments to implement effective fuels management, habitat recovery/restoration, fire operations, and post-fire rehabilitation (Step 2b). These activity/implementation plans will serve as the basis for NEPA analysis of site-specific projects.

Step 2a- Review of Step 1 Data and Incorporation of Local Information

Evaluate the accuracy and utility of Step 1 geospatial layers for focal habitats by incorporating more accurate or locally relevant:

- Vegetation maps (especially sagebrush cover)
- Updated or higher resolution conifer expansion layers (if applicable)
- Soil survey and ecological site descriptions
- Weather station, including Remote Automatic Weather Stations, data
- PACs, focal habitats, winter habitats, sage-grouse population distributions (i.e., more recent BBD surveys)
- Maps of cheatgrass and other invasive annual grasses that degrade sage-grouse habitat
- Wildfire polygons including perimeters and unburned islands within burn polygons
- Treatment locations and success (consult US Geological Survey Land Treatment Digital Library at http://ltdl.wr.usgs.gov/). The Land Treatment Digital Library allows the user to search on treatment results on an ecological site basis.
- Models and tools to help inform management strategies. For example, data which characterizes wildfire potential can help identify risk to focal habitats and help plan fire suppression and fuels management strategies to address these risks.
- Rapid Ecoregional Assessments
- Land Use Plans
- Appropriate monitoring or inventory information
- Any other geospatial data or models that could improve the accuracy of the assessment process

It is essential that subregional or local information and geospatial data be subjected to a quality control assessment to ensure that it is appropriate to use in developing Step 2b activity and implementation plans. Since PACs and focal habitats usually transcend multiple administrative boundaries, a collaborative approach is highly recommended for Step 2a.

A series of questions tied to the management strategies described in the Introduction section follows to assist managers in developing the framework to complete Step 2b (development of activity/implementation plans). The questions that follow apply to the focal habitats (and buffer areas around focal areas where management strategies may be more effectively applied) and will help in developing coordinated implementation/activity plans. These questions should not limit the scope of the assessment and additional questions relative to local situations are encouraged. These questions portray the minimum degree of specificity for focal habitats in order for offices to complete Step 2a.

Fuels Management

1. Where are the priority fuels management areas (spatially defined treatment opportunity areas that consider fire risk, fuels conditions, and focal habitats [including areas adjacent to focal habitats])?
2. Based on fire risk to focal habitats, what types of fuels treatments should be implemented to reduce this threat (for example, linear features that can be used as anchors during suppression operations)?
3. Considering resistance/resilience concepts and the landscape context from Step 1, where should treatments be applied in and around focal habitats to:
   a. Constrain fire spread?
   b. Reduce the extent of conifer expansion?
   c. Augment future suppression efforts by creating fuel breaks or anchors for suppression?
4. Based on opportunities for fire to improve/restore focal habitats, what types of fuels treatments should be implemented to compliment managed wildfire by modifying fire behavior and effects?
5. Are there opportunities to utilize a coordinated fuels management approach across jurisdictional boundaries?
6. What fuel reduction techniques will be most effective that are within acceptable impact ranges of local sage-grouse populations, including but not limited to grazing, prescribed fire, chemical, and biological and mechanical treatments? Will combinations of these techniques improve effectiveness (e.g., using livestock to graze fine fuels in a mowed fuel break in sagebrush)?

Habitat Recovery/Restoration

1. Are there opportunities for habitat restoration treatments to protect, enhance or maintain sage-grouse focal habitat especially to restore connectivity of focal area habitat?
2. Considering the resistance and resilience GIS data layer (Figure 4) and the Sage-Grouse Habitat Matrix (Chambers et al. 2014; Table 2), where and why would passive or active restoration treatments be used?
3. What are the risks and opportunities of restoring habitat with low resistance and resilience including the warm/dry and cool/dry soil moisture/temperature regime areas?
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries to effectively complete habitat restoration in focal habitats?

Fire Operations

1. Where are priority fire management areas (spatially defined polygons having the highest need for preparedness and suppression action)?

2. Where are the greatest wildfire risks to focal habitats considering trends in fire occurrence and fuel conditions (see Figure 10)?
3. Where do opportunities exist that could enhance or improve suppression capability in and around focal habitats?
    a) For example, increased water availability through installation of helicopter refill wells or water storage tanks.
    b) Decreased response time through pre-positioned resources or staffing remote stations.
4. Should wildfire be managed (per land use plan objectives) for improving focal habitat (e.g., reducing conifer expansion), and if so where, and under what conditions?
5. How can fire management be coordinated across jurisdictional boundaries to reduce risk or to improve focal habitats?

Post-fire Rehabilitation

1. Where are areas that are a high priority for post-fire rehabilitation to improve habitat connectivity if a wildfire occurs?
2. Which areas are more conducive (higher resistance and/or resilience) to recovery and may not need reseeding after a wildfire?
3. What opportunities to build in fire resistant fuel breaks to reduce the likelihood of future wildfires impacts on seeded or recovering areas?
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries to implement rehabilitation practices?

The outcome of Step 2a is the assembly of the pertinent information and GIS layers to assist managers in developing implementation or activity plans to address wildfires, invasive annual grasses, and conifer expansion in focal habitats. Activity plans generally refer to plans where management of a resource is changed (livestock grazing plans) whereas implementation plans are generally associated with treatments.

Step 2b- Preparation of Activity/Implementation Plans

Activity/implementation plans are prepared to implement the appropriate management strategies within and adjacent to focal habitats. Since focal habitats cross jurisdictional boundaries, it is especially important that a collaborative approach be used to develop implementation/activity plans. The process of identifying partners and creating collaborative teams to develop these plans is a function of state, regional, and local managers and is not addressed as part of this step.

Implementation/activity plans are required to:

1. Address issues in and around focal habitats related to wildfires, invasive annual grasses, and conifer expansion

2. Use resistance to invasive annual grasses and resilience after disturbance (where appropriate) as part of the selection process for implementing management strategies
3. Emphasize application of management strategies within or near focal habitats with low resistance and resilience (warm/dry and cool/dry soil moisture/temperature regimes) invasive annual grasses and wildfires
4. Use the best available local information to inform the assessment process
5. Encourage collaboration and coordination with focal habitats across jurisdictional boundaries
6. Be adaptive to changing conditions, disturbances, and modifications of PAC boundaries

FIAT recommends considering other factors, such as adaptive management for climate change, local sagebrush mortality due to aroga moth or other pests, and cheatgrass die-off areas in developing activity/implementation plans. The latter two factors could influence where and what kind of management strategies may be needed to address the loss of habitat or changes in fuel characteristics (e.g., load and flammability) associated with these mortality events.

The following recommendations are provided to assist in the preparation of activity/implementation plans:

Fuels Management

1. Spatially delineate priority areas for fuel management treatments per Step 2a information considering:
   a. Linear fuel breaks along roads
   b. Other linear fuel breaks to create anchor points
   c. Prescribed burning which would meet objectives identified in the Fish and Wildlife Service's Conservation Objectives Team (COT) report
   d. Mechanical (e.g., treatment of conifer expansion into sagebrush communities)
   e. Other mechanical, biological, or chemical treatments
   f. If they exist, spatially delineated areas where fuel treatments would increase the ability to use fire to improve/enhance focal habitats.
2. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of fuels treatments.
3. Quantify a projected level of treatment within or near focal habitats.
   a. Identify treatments (projects) to be planned within or near focal habitats.
   b. Include a priority and proposed work plan for proposed treatments.

Habitat Recovery/Restoration

1. Spatially delineate priority areas for restoration, using criteria established in Step 2a. Priority areas for restoration should be delineated by treatment methods:
   a. Seeding priority areas
   b. Invasive annual grasses priority treatment areas (herbicide, mechanical, biological, combination)

    c. Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding).
    d. Include tables, maps or appropriate info.
2. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of restoration treatments.
3. Include a priority or implementation schedule for proposed restoration treatment

Fire Operations

1. Spatially delineate priority areas for fire suppression, based upon criteria established in Step 2a. Priority areas for fire operations should be delineated by type, such as:
    a. Initial attack priority areas
    b. Resource pre-positioning and staging priority areas
2. Spatially delineate areas where opportunities exist to enhance or improve suppression capability.
3. Spatially delineate areas where wildfire can be managed to achieve land use plan and COT objectives.

Post-Fire Rehabilitation

1. Spatially delineate priority areas for post-fire rehabilitation using criteria in Step 2a.
2. Priority areas for post-fire rehabilitation should be based on resistance and resiliency and pre-fire landscape sagebrush cover and include consideration of:
    a. Seeding priority areas
    b. Invasive annual grasses priority treatment areas (herbicide, mechanical, biological (herbivory or seeding),
    c. Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding)
3. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of post-fire rehabilitation treatments.

This completes the assessment process and sets the stage for more detailed project planning and NEPA associated with implementing on-the-ground treatments and management changes.

Members of the FIAT Development and Review teams are listed in Appendix 5.

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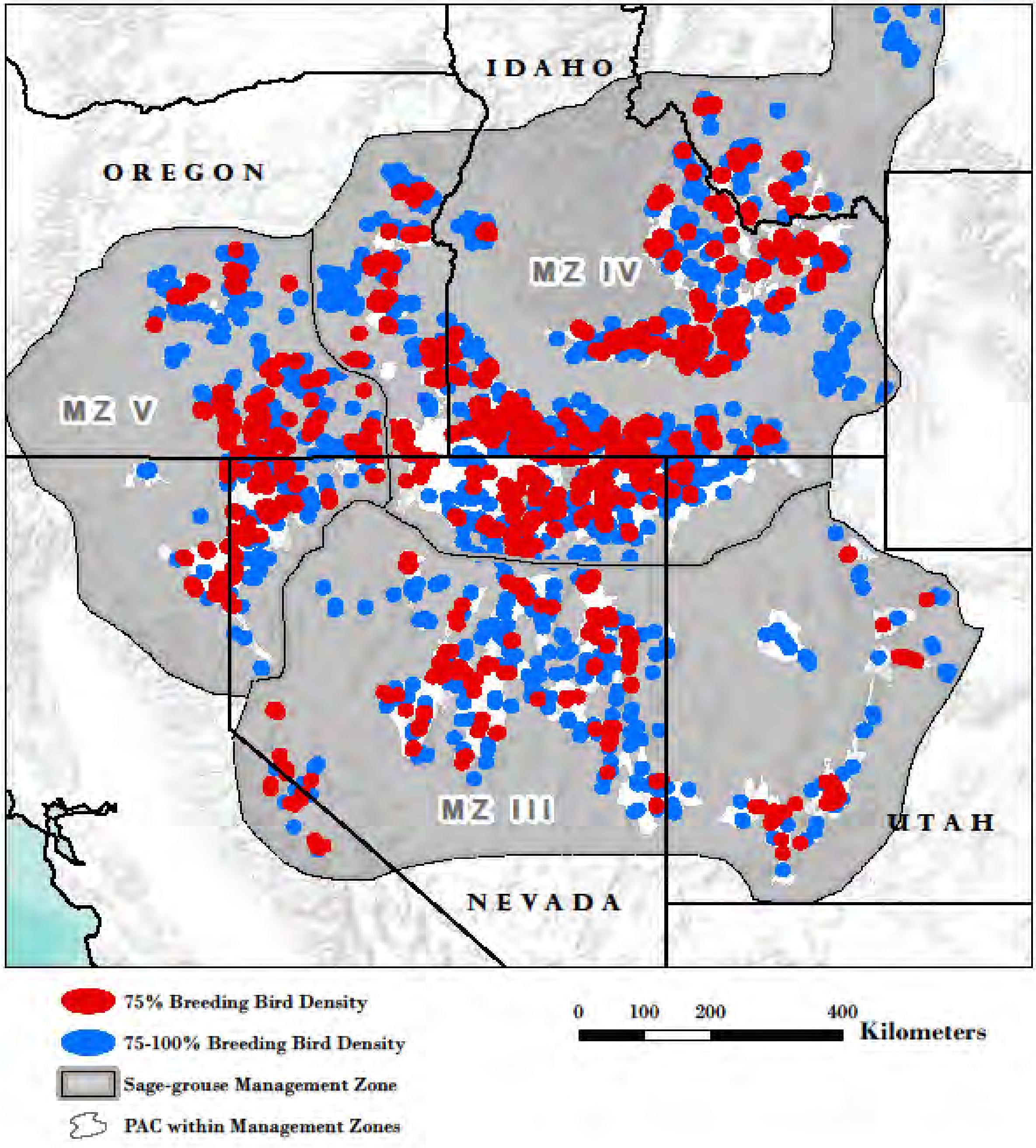
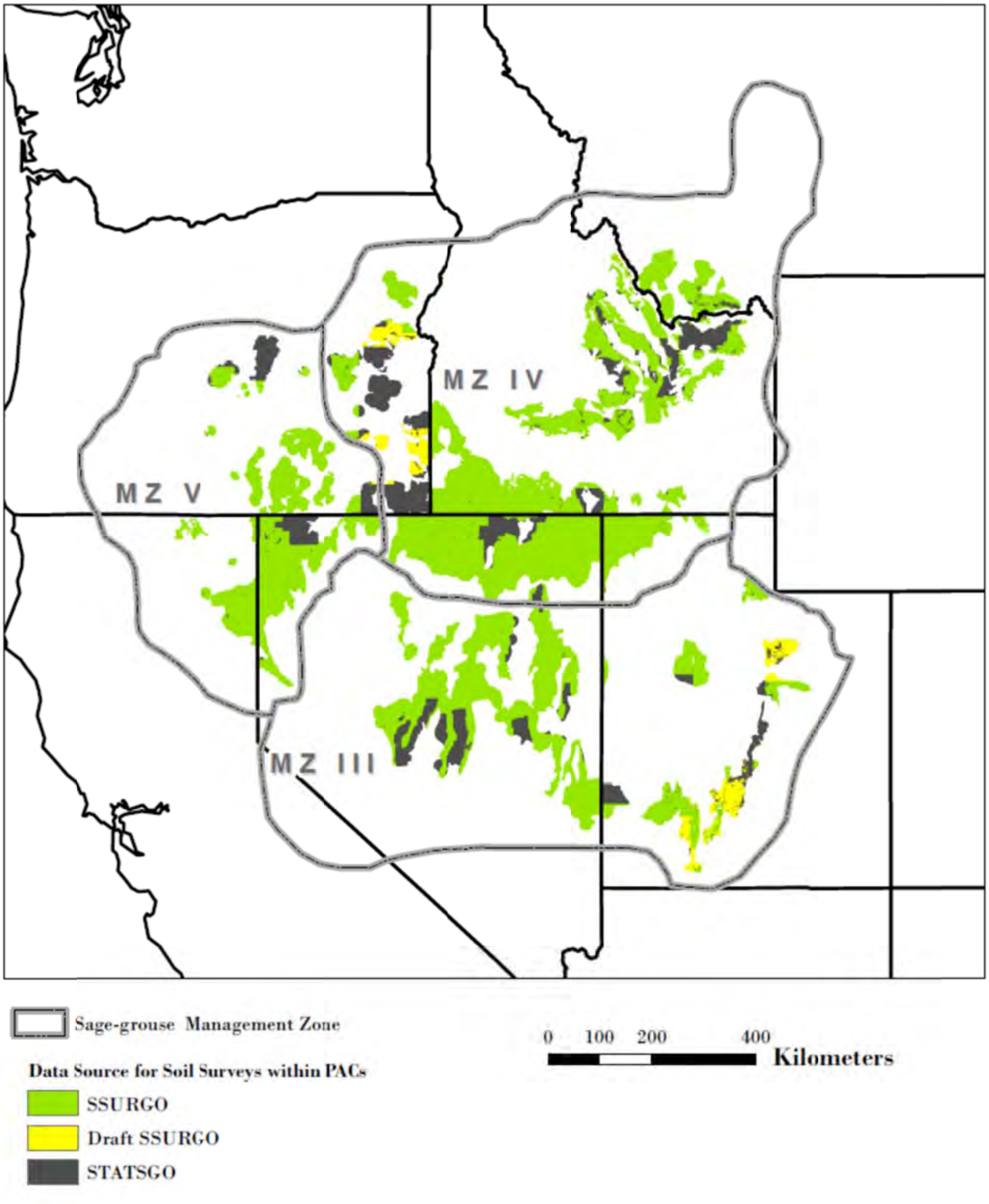
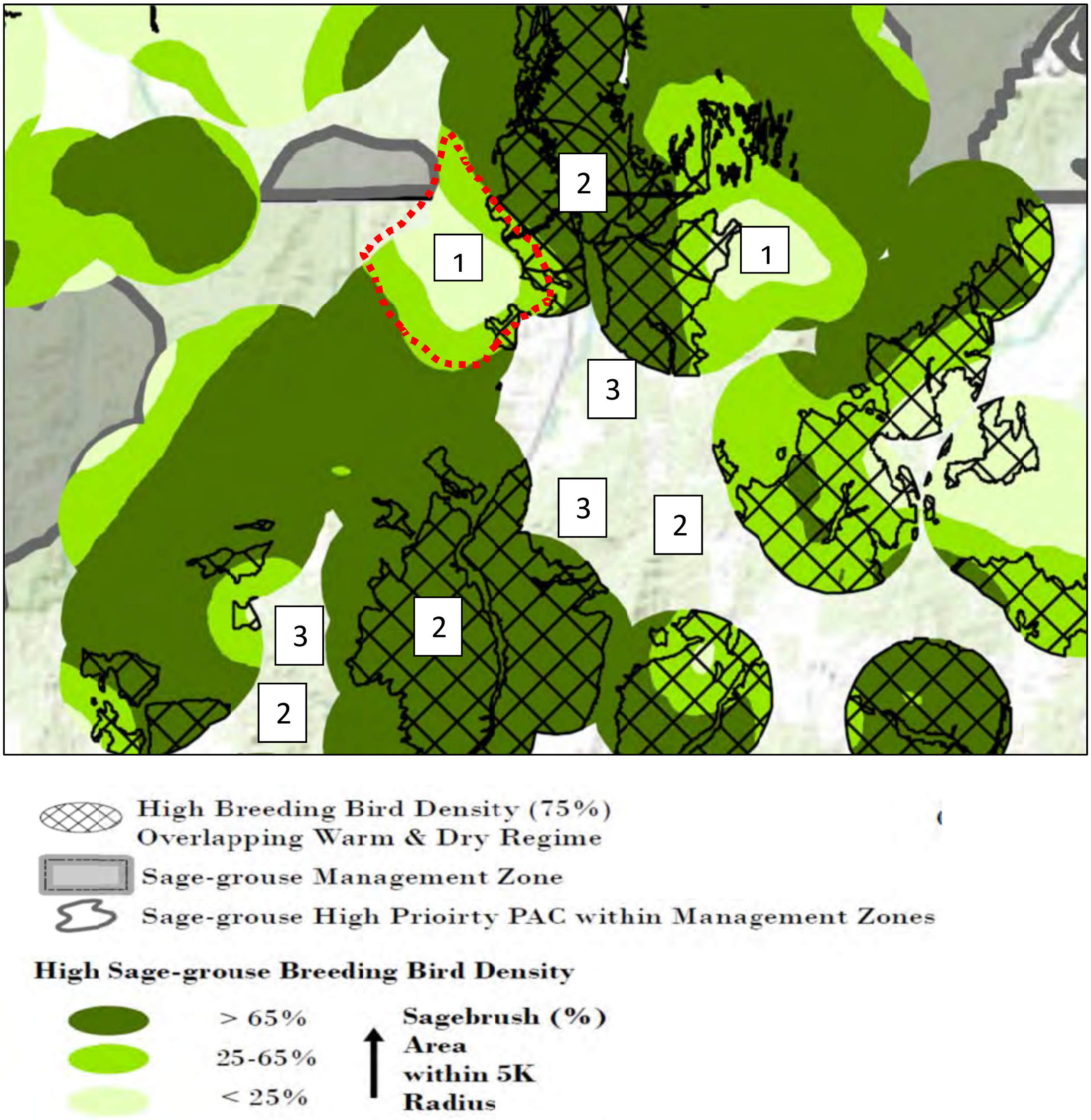
Appendix 1. Sage-grouse breeding bird density thresholds for 75% and 100% of the breeding birds, Management Zones, and PACs. Breeding bird density of 75 to 100% is included in this figure to provide context for local management units when making decisions concerning connectivity between populations and PACs.



Appendix 2. Gaps in SSURGO soil survey data in Management Zones III, IV, and V. STATSGO2 soil survey data used to fill these gaps.



Appendix 3. Example of potential management strategies applied to Wildfire/Invasive Annual Grass Scenario.

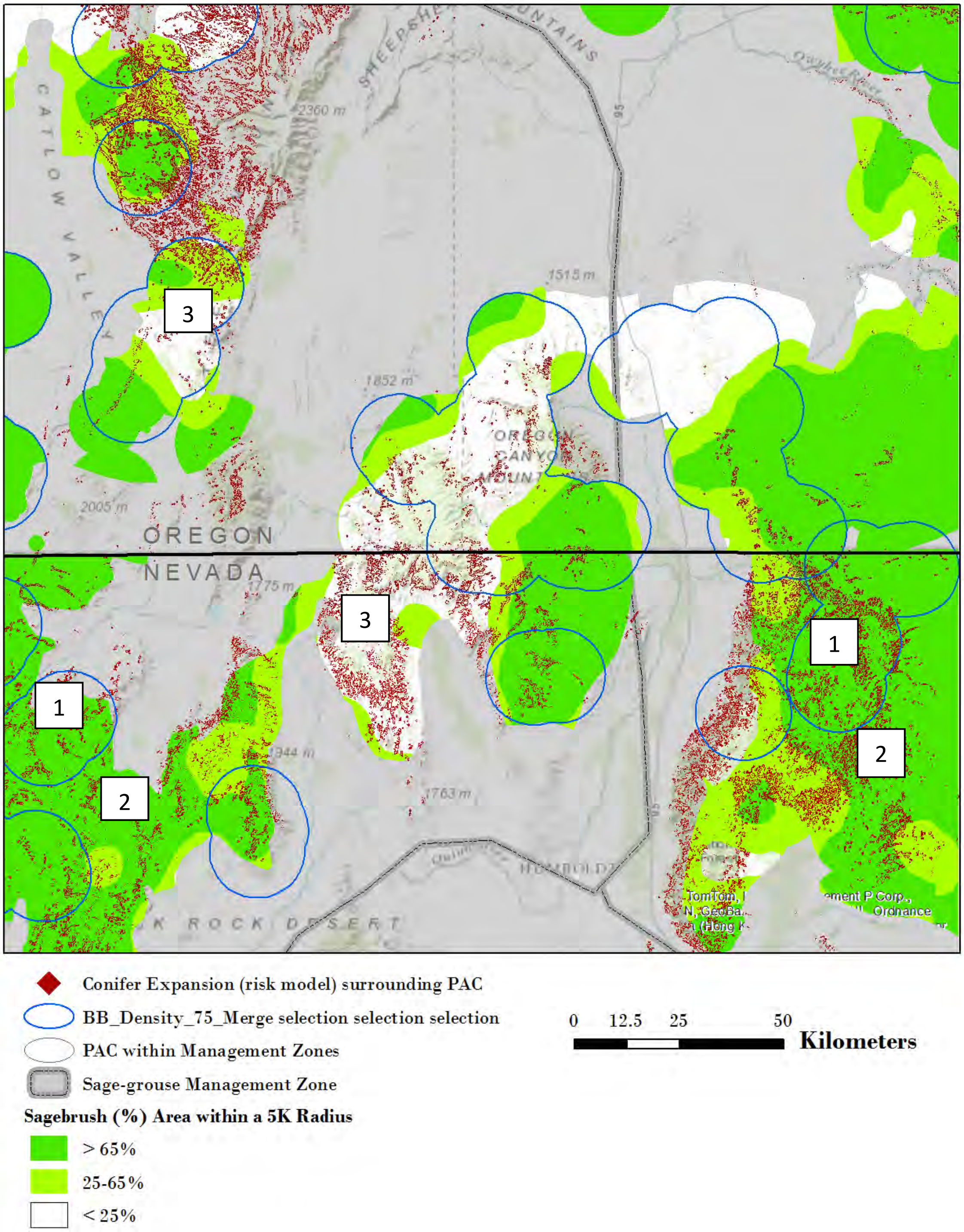


1 High priority for habitat restoration and post-fire rehabilitation to restore connectivity.

2 High priority for fire suppression within and around area given >65% sagebrush landscape cover and low resistance/resilience.

3 **High priority for fuels management to reduce likelihood of wildfires in low resistance/resilience habitat** with >65% landscape cover.

Appendix 4. Management strategy example for Western Juniper expansion.



1 High priority (emphasis area) for juniper control (>25% landscape sagebrush cover & 75% BBD)

2 Moderate priority (emphasis area) for juniper control (>25% landscape sagebrush cover)

3 Very low priority (<25% landscape sagebrush cover)

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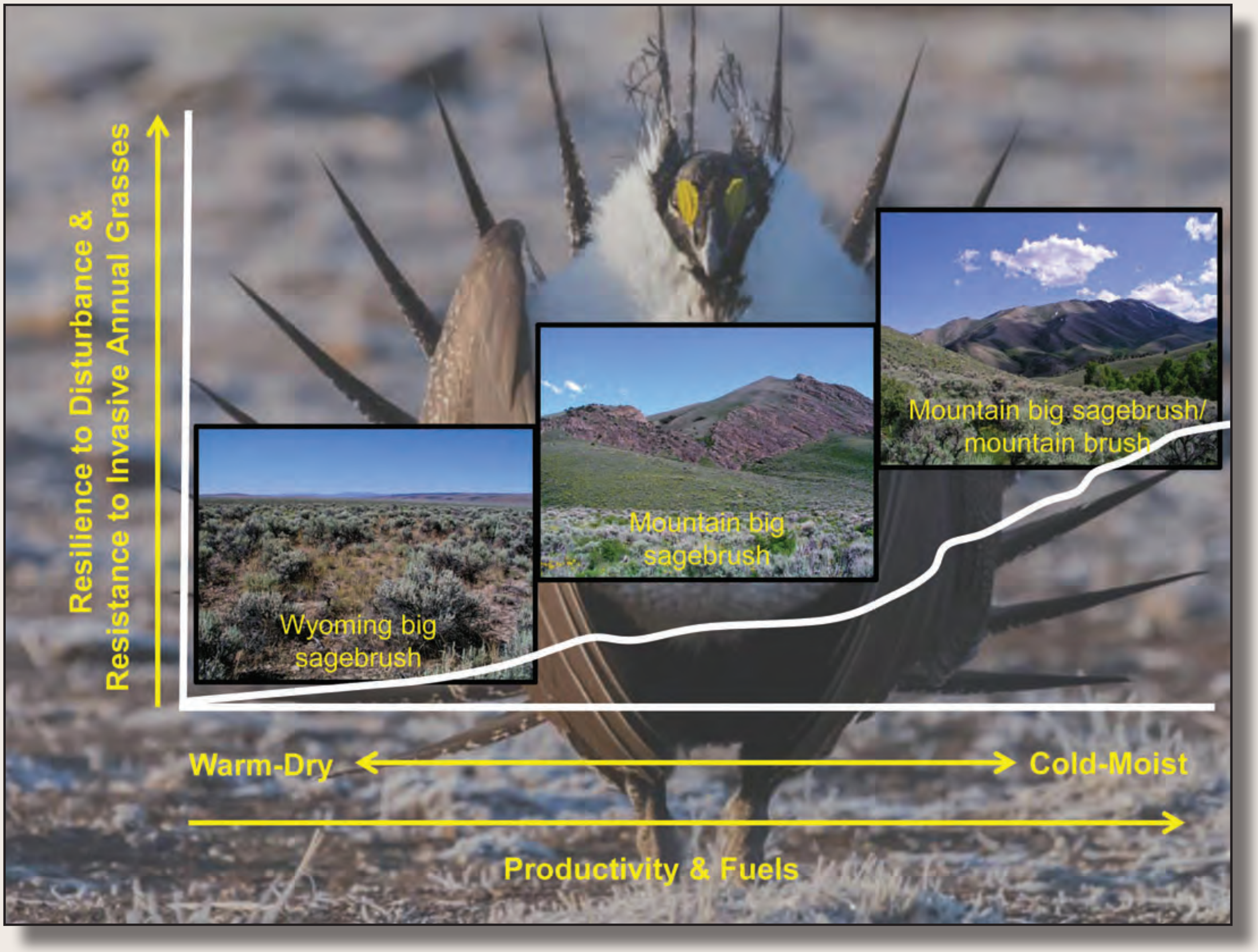
Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach

Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Mike Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, and Amarina Wuenschel



Forest Service Rocky Mountain Research Station General Technical Report RMRS-GTR-326 September 2014

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Abstract

This Report provides a strategic approach for conservation of sagebrush ecosystems and Greater Sage-Grouse (sage-grouse) that focuses specifically on habitat threats caused by invasive annual grasses and altered fire regimes. It uses information on factors that influence (1) sagebrush ecosystem resilience to disturbance and resistance to invasive annual grasses and (2) distribution, relative abundance, and persistence of sage-grouse populations to develop management strategies at both landscape and site scales. A sage-grouse habitat matrix links relative resilience and resistance of sagebrush ecosystems with sage-grouse habitat requirements for landscape cover of sagebrush to help decision makers assess risks and determine appropriate management strategies at landscape scales. Focal areas for management are assessed by overlaying matrix components with sage-grouse Priority Areas for Conservation (PACs), breeding bird densities, and specific habitat threats. Decision tools are discussed for determining the suitability of focal areas for treatment and the most appropriate management treatments.

Keywords: sagebrush habitat, Greater Sage-Grouse, fire effects, invasive annual grasses, management prioritization, conservation, prevention, restoration

Cover photos: *Greater Sage-grouse photo by Rick McEwan; sagebrush habitat photos by Jeanne Chambers.*

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Contents

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Introduction

An unprecedented conservation effort is underway across 11 States in the western United States to reduce threats to Greater Sage-Grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) and the sagebrush ecosystems on which they depend (fig. 1). Recent efforts were accelerated by the March 2010 determination that sage-grouse warrant protection under the Federal Endangered Species Act, and by increased emphasis on broad collaboration among state and Federal partners to proactively identify and implement actions to reverse current trends (USFWS 2010, 2013). Conservation success hinges on being able to achieve "the long-term conservation of sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities" (USFWS 2013). While strides are being made to curtail a host of threats across the range, habitat loss and fragmentation due to wildfire and invasive plants remain persistent challenges to

Figure 1. Greater Sage-Grouse (*Centrocercus urophasianus*) (photo by Charlotte Ganskopp).

achieving desired outcomes – particularly in the western portion of the range (Miller et al. 2011; USFWS 2010; 2013). Management responses to date have not been able to match the scale of this problem. Natural resource managers are seeking coordinated approaches that focus appropriate management actions in the right places to maximize conservation effectiveness (Wisdom and Chambers 2009; Murphy et al. 2013).

Improving our ability to manage for resilience to disturbance and resistance to invasive species is fundamental to achieving long-term sage-grouse conservation objectives. Resilient ecosystems have the capacity to ***regain*** their fundamental structure, processes, and functioning when altered by stressors like drought and disturbances like inappropriate livestock grazing and altered fire regimes (Holling 1973; Allen et al. 2005). Species resilience refers to the ability of a species to recover from stressors and disturbances (USFWS 2013), and is closely linked to ecosystem resilience. Resistant ecosystems have the capacity to ***retain*** their fundamental structure, processes, and functioning when exposed to stresses, disturbances, or invasive species (Folke et al. 2004). Resistance to invasion by nonnative plants is increasingly important in sagebrush ecosystems; it is a function of the abiotic and biotic attributes and ecological processes of an ecosystem that limit the population growth of an invading species (D'Antonio and Thomsen 2004**)**. A detailed explanation of the factors that influence resilience and resistance in sagebrush ecosystems is found in Chambers et al. 2014.

In general, species are likely to be more resilient if large populations exist in large blocks of high quality habitat across the full breadth of environmental variability to which the species is adapted (Redford et al. 2011). Because sage-grouse are a broadly distributed and often wide-ranging species that may move long-distances between seasonal habitats (Connelly et al. 2011a,b), a strategic approach that integrates both landscape prioritization and site-scale decision tools is needed. This document develops such an approach for the conservation of sagebrush habitats across the range of sage-grouse with an emphasis on the western portion of the range. In recent years, information and tools have been developed that significantly increase our understanding of factors that influence the resilience of sagebrush ecosystems and the distribution of sage-grouse populations, and that allow us to strategically prioritize management activities where they are most likely to be effective and to benefit the species. Although the emphasis of this Report is on the western portion of the sage-grouse range, the approach has management applicability to other sagebrush ecosystems.

In this report, we briefly review causes and effects of invasive annual grasses and altered fire regimes, and then discuss factors that determine resilience to disturbances like wildfire and resistance to invasive annual grasses in sagebrush ecosystems. We illustrate how an understanding of resilience and resistance, sagebrush habitat requirements for sage-grouse, and consequences that invasive annual grasses and wildfire have on sage-grouse populations can be used to develop management strategies at both landscape and site scales. A sage-grouse habitat matrix is provided that links relative resilience and resistance with habitat requirements for landscape cover of sagebrush to both identify priority areas for management and determine effective management strategies at landscape scales. An approach for assessing focal areas for sage-grouse habitat management is described that overlays Priority Areas for Conservation (PACs) and breeding bird densities with resilience and resistance and habitat suitability to spatially link sage-grouse populations with habitat conditions and risks. The use of this approach is illustrated for the western portion of the range and for a diverse area in the northeast corner of Nevada. It concludes with a discussion of the tools available for determining the suitability of focal areas for treatment and the most appropriate management treatments. Throughout the document, the emphasis is on using this approach to guide and assist fire operations, fuels management, post-fire rehabilitation, and habitat restoration activities to maintain or enhance sage-grouse habitat.

Threats of Invasive Annual Grasses and Altered Fire Regimes to Sagebrush Ecosystems and Sage-Grouse

Effects on Sagebrush Ecosystems

Sage-grouse habitat loss and fragmentation due to wildfire and invasive plants are widely recognized as two of the most significant challenges to conservation of the species, particularly in the western portion of the range (Miller et al. 2011; USFWS 2010, 2013). During pre-settlement times, sagebrush-dominated ecosystems had highly variable fire return intervals that ranged from decades to centuries (Frost 1998; Brown and Smith 2000; Miller et al. 2011). At coarse regional scales, fire return intervals in sagebrush ecological types were determined largely by climate and its effects on fuel abundance and continuity. Consequently, fire frequency was higher in sagebrush types with greater productivity at higher elevations and following periods of increased precipitation than in lower elevation and less productive ecosystems (West 1983b; Mensing et al. 2006). At local scales within sagebrush types, fire return intervals likely were determined by topographic and soil effects on productivity and fuels and exhibited high spatial and temporal variability (Miller and Heyerdahl 2008).

Euro-American arrival in sagebrush ecosystems began in the mid-1800s and initiated a series of changes in vegetation composition and structure that altered fire regimes and resulted in major changes in sagebrush habitats. The first major change in fire regimes occurred when inappropriate grazing by livestock led to a decrease in native perennial grasses and forbs and effectively reduced the abundance of fine fuels (Knapp 1996; Miller and Eddleman 2001; Miller et al. 2011). Decreased competition from perennial herbaceous species, in combination with ongoing climate change and favorable conditions for woody species establishment at the turn of the twentieth century, resulted in increased abundance of shrubs (primarily *Artemisia* species) and trees, including juniper (*Juniperus occidentalis*, *J. osteosperma*) and piñon pine (*Pinus monophylla*), at mid to high elevations (Miller and Eddleman 2001; Miller et al. 2011). The initial effect of these changes in fuel structure was a reduction in fire frequency and size. The second major change in fire regimes occurred when non-native annual grasses (e.g., *Bromus tectorum, Taeniatherum caput-medusa*) were introduced from Eurasia in the late 1800s and spread rapidly into low to mid-elevation ecosystems with depleted understories (Knapp 1996). The invasive annual grasses increased the amount and continuity of fine fuels in many lower elevation sagebrush habitats and initiated annual grass/fire cycles characterized by shortened fire return intervals and larger, more contiguous fires (fig. 2; D'Antonio and Vitousek 1992; Brooks et al. 2004). Since settlement of the region, cheatgrass came to dominate as much as 4 million hectares (9.9 million acres) in the states of Nevada and Utah alone (fig. 3; Bradley and Mustard 2005). The final change in fire regimes occurred as a result of expansion of juniper and piñon pine trees into sagebrush types at mid to high elevations and a reduction of the grass, forb, and shrub species associated with these types. Ongoing infilling of trees is increasing woody fuels, but reducing fine fuels and resulting in less frequent fires (fig. 4; Miller et al. 2013). Extreme burning conditions (high winds, high temperatures, and low relative humidity) in high density (Phase III) stands are resulting in large and severe fires that result in significant losses of above- and below-ground organic matter (sensu Keeley 2009) and have detrimental ecosystem effects (Miller et al. 2013). Based on tree-ring analyses at several Great Basin sites, it is estimated that the extent of piñon and/or juniper woodland increased two to six fold since settlement, and most of that area will exhibit canopy closure within the next 50 years (Miller et al. 2008).

Figure 2. A wildfire that burned through a Wyoming big sagebrush ecosystem with an invasive annual grass understory in southern Idaho (top) (photo by Douglas J. Shinneman), and a close-up of a fire in a Wyoming big sagebrush ecosystem (bottom) (photo by Scott Schaff).

Figure 3. A wildfire that started in invasive annual grass adjacent to a railroad track and burned upslope into a mountain big sagebrush and Jeffrey pine ecosystem in northeast Nevada (top). A big sagebrush ecosystem that has been converted to invasive annual grass in north central Nevada (bottom) (photos by Nolan E. Preece).

Figure 4. Expansion of Utah juniper trees into a mountain big sagebrush ecosystem in east central Utah (top) that is resulting in progressive infilling of the trees and exclusion of native understory species (bottom) (photos by Bruce A. Roundy).

Effects on Sage-Grouse Habitat Selection and Population Dynamics

Understanding the effects of landscape changes on sage-grouse habitat selection and population dynamics can help managers apply more strategic and targeted conservation actions to reduce risks. Two key land cover shifts resulting from invasive annual grasses and altered fire regimes are affecting the ability to achieve the range-wide goal of stable-to-increasing population trends − large-scale reduction of sagebrush cover and conversion of sagebrush ecosystems to annual grasslands.

Sage-grouse are true sagebrush obligates that require large and intact sagebrush landscapes. Consequently, wildfires occurring at the extremes of the natural range of variability that remove sagebrush, even temporarily, over large areas and over short time periods often have negative consequences for sage-grouse. Several range-wide studies have identified the proportion of sagebrush-dominated land cover as a key indicator of sage-grouse population persistence and, importantly, have revealed critical levels of sagebrush landscape cover required by sage-grouse (see Appendix 2 for a description of landscape cover and how it is derived). Knick et al. (2013) found that 90% of active leks in the western portion of the range had more than 40% landscape cover of sagebrush within a 5-km (3.1-mi) radius of leks. Another range-wide analysis documented a high risk of extirpation with <27% sagebrush landscape cover and high probability of persistence with >50% sagebrush landscape cover within 18-km (11.2-mi) of leks (Wisdom et al. 2011). Similarly, Aldridge et al. (2008) found long-term sage-grouse persistence required a minimum of 25%, and preferably at least 65%, sagebrush landscape cover at the 30-km (18.6-mi) scale. Considered collectively, cumulative disturbances that reduce the cover of sagebrush to less than a quarter of the landscape have a high likelihood of resulting in local population extirpation, while the probability of maintaining persistent populations goes up considerably as the proportion of sagebrush cover exceeds two-thirds or more of the landscape. Reduction of sagebrush cover is most critical in low to mid elevations where natural recovery of sagebrush can be very limited within timeframes important to sage-grouse population dynamics (Davies et al. 2011).

Nonnative annual grasses and forbs have invaded vast portions of the sage-grouse range, reducing both habitat quantity and quality (Beck and Mitchell 2000; Rowland et al. 2006; Miller et al. 2011; Balch et al. 2013). Due to repeated fires, some low- to mid-elevation native sagebrush communities are shifting to novel annual grassland states resulting in habitat loss that may be irreversible with current technologies (Davies et al. 2011; Miller et al. 2011; Chambers et al. 2014). At the broadest scales, the presence of non-native annual grasslands on the landscape may be influencing both sage-grouse distribution and abundance. In their analysis of active leks, Knick et al. (2013) found that most leks had very little annual grassland cover (2.2%) within a 5-km (3.1-mi) radius of the leks; leks that were no longer used had almost five times as much annual grassland cover as active leks. Johnson et al. (2011) found that lek use became progressively less as the cover of invasive annual species increased at both the 5-km (3.1-mi) and 18-km (11.2-mi) scales. Also, few leks had >8% invasive annual vegetation cover within both buffer distances.

Patterns of nest site selection also suggest local impacts of invasive annual grasses on birds. In western Nevada, Lockyer (2012) found that sage-grouse selected large expanses of sagebrush-dominated areas and, within those areas, sage-grouse selected microsites with higher shrub canopy cover and lower cheatgrass cover. Average cheatgrass cover at selected locations was 7.1% compared to 13.3% at available locations. Sage-grouse hens essentially avoided nesting in areas with higher cheatgrass cover. Kirol et al. (2012) also found nest-site selection was negatively correlated with the presence of cheatgrass in south-central Wyoming.

Sage-grouse population demographic studies in northern Nevada show that recruitment and annual survival also are affected by presence of annual grasslands at larger scales. Blomberg et al. (2012) analyzed land cover within a 5-km (3.1-mi) radius of leks and found that leks impacted by annual grasslands experienced lower recruitment than non-impacted leks, even following years of high precipitation. Leks that were not affected by invasive annual grasslands exhibited recruitment rates nearly twice as high as the population average and nearly six times greater than affected leks during years of high precipitation.

Piñon and juniper expansion at mid to upper elevations into sagebrush ecosystems also has altered fire regimes and reduced sage-grouse habitat availability and suitability over large areas with population-level consequences (Miller et al. 2011; Baruch-Mordo et al. 2013; Knick et al. 2013). Conifer expansion results in non-linear declines in sagebrush cover and reductions in perennial native grasses and forbs as conifer canopy cover increases (Miller et al. 2000) and this has direct effects on the amount of available habitat for sagebrush-obligate species. Sites in the late stage of piñon and juniper expansion and infilling (Phase III from Miller et al. 2005) have reduced fire frequency (due to decreased fine fuels), but are prone to higher severity fires (due to increased woody fuels) which significantly reduces the likelihood of sagebrush habitat recovery (fig. 5) (Bates et al. 2013). Even before direct habitat loss occurs, sage-grouse avoid or are negatively associated with conifer cover during all life stages (i.e., nesting, brood-rearing, and wintering; Doherty et al. 2008, 2010a; Atamian et al. 2010; Casazza et al. 2011). Also, sage-grouse incur population-level impacts at a very low level of conifer encroachment. The ability to maintain active leks is severely compromised when conifer canopy exceeds 4% in the immediate vicinity of the lek (Baruch-Mordo et al. 2013), and most active leks average less than 1% conifer cover at landscape scales (Knick et al. 2013).

Figure 5. A post-burn, Phase III, singleleaf piñon and Utah juniper dominated sagebrush ecosystem in which soils are highly erosive and few understory plants remain (photo by Jeanne C. Chambers).

Resilience to Disturbance and Resistance to Invasive Annual Grasses in Sagebrush Ecosystems

Our ability to address the changes occurring in sagebrush habitats can be greatly enhanced by understanding the effects of environmental conditions on resilience to stress and disturbance, and resistance to invasion (Wisdom and Chambers 2009; Brooks and Chambers 2011; Chambers et al. 2014). In cold desert ecosystems, resilience of native ecosystems to stress and disturbance changes along climatic and topographic gradients. In these ecosystems, Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*), mountain big sagebrush (*A. t.* spp. *vaseyana*), and mountain brush types (e.g., mountain big sagebrush, snowberry [*Symphorocarpus* spp.], bitterbrush [*Purshia tridentata*]) occur at progressively higher elevations and are associated with decreasing temperatures and increasing amounts of precipitation, productivity, and fuels (fig. 6; West and Young 2000). Piñon pine and juniper woodlands are typically associated with mountain big sagebrush types, but can occur with relatively cool and moist Wyoming big sagebrush types and warm and moist mountain brush types (Miller et al. 2013). Resilience to disturbance, including wildfire, has been shown to increase along these elevation gradients (fig. 7A) (Condon et al. 2011; Davies et al. 2012; Chambers et al. 2014; Chambers et al. *in press*). Higher precipitation and cooler temperatures, coupled with greater soil development and plant productivity at mid to high elevations, can result in greater resources and more favorable environmental conditions for plant growth and reproduction (Alexander et al. 1993; Dahlgren et al. 1997). In contrast, minimal precipitation and high temperatures at low elevations result in lower resource availability for plant growth (West 1983a,b;

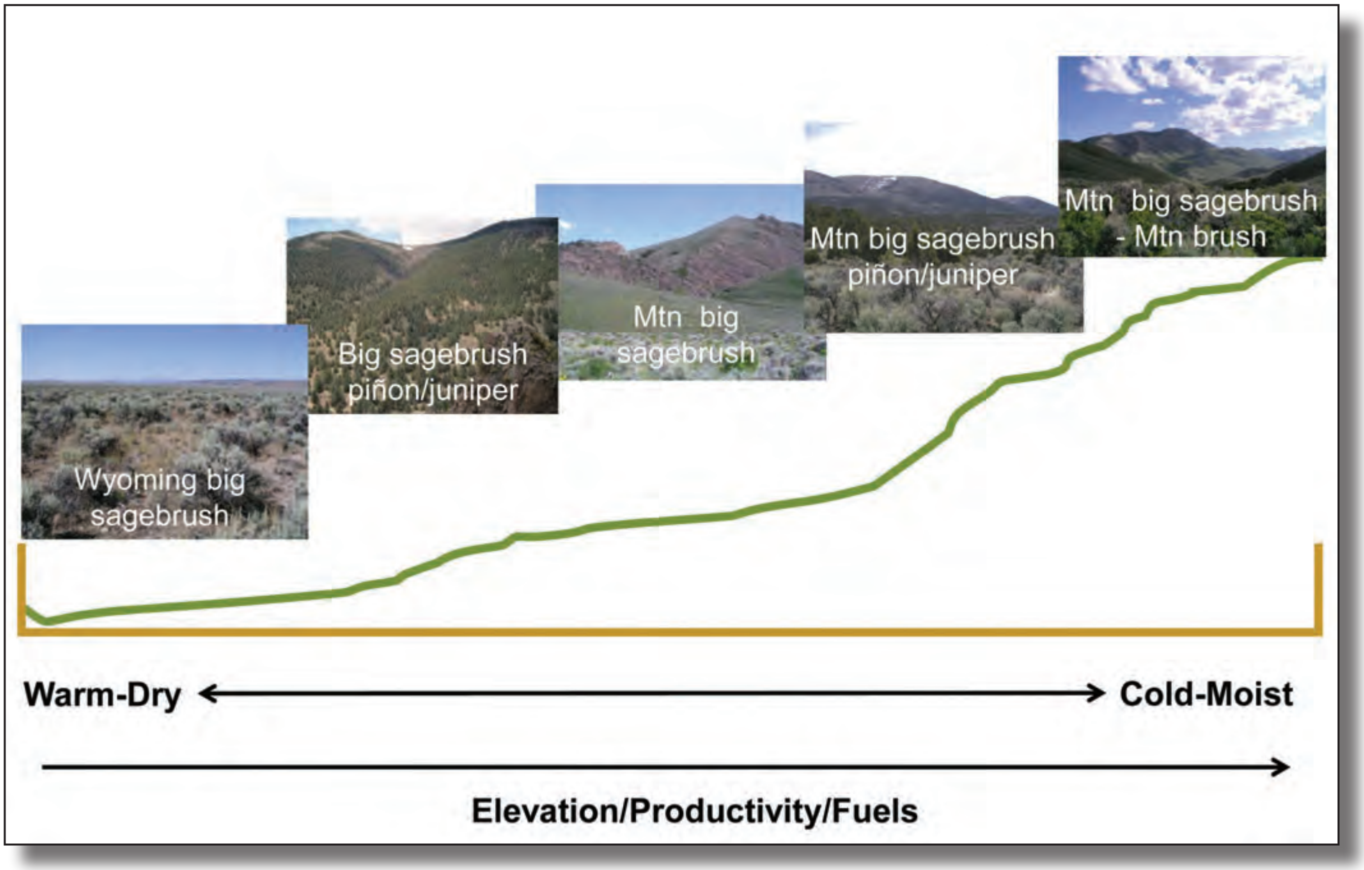


Figure 6. The dominant sagebrush ecological types that occur along environmental gradients in the western United States. As elevation increases, soil temperature and moisture regimes transition from warm and dry to cold and moist and vegetation productivity and fuels become higher.

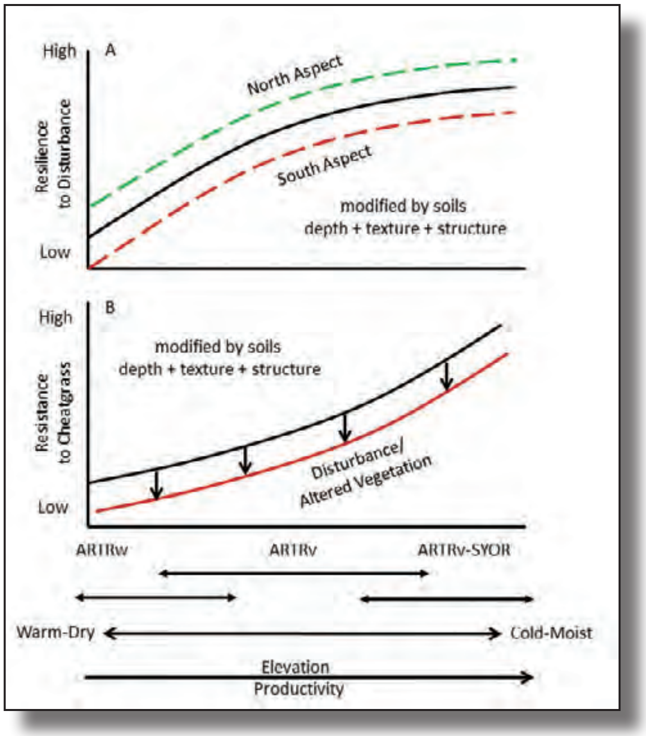


Figure 7. (**A)** Resilience to disturbance and (**B)** resistance to cheatgrass over a typical temperature/precipitation gradient in the cold desert. Dominant ecological sites occur along a continuum that includes Wyoming big sagebrush on warm and dry sites, to mountain big sagebrush on cool and moist sites, to mountain big sagebrush and root-sprouting shrubs on cold and moist sites. Resilience increases along the temperature/precipitation gradient and is influenced by site characteristics like aspect. Resistance also increases along the temperature/precipitation gradient and is affected by disturbances and management treatments that alter vegetation structure and composition and increase resource availability (modified from Chambers et al. 2014; Chambers et al. *in press*).

Smith and Nowak 1990). These relationships also are observed at local plant community scales where aspect, slope, and topographic position affect solar radiation, erosion processes, effective precipitation, soil development and vegetation composition and structure (Condon et al. 2011; Johnson and Miller 2006).

Resistance to invasive annual grasses depends on environmental factors and ecosystem attributes and is a function of (1) the invasive species' physiological and life history requirements for establishment, growth, and reproduction, and (2) interactions with the native perennial plant community including interspecific competition and response to herbivory and pathogens. In cold desert ecosystems, resistance is strongly influenced by soil temperature and moisture regimes (Chambers et al. 2007; Meyer et al. 2001). Germination, growth, and/or reproduction of cheatgrass is physiologically limited at low elevations by frequent, low precipitation years, constrained at high elevations by low soil temperatures, and optimal at mid elevations under relatively moderate temperature and water availability (fig. 7B; Meyer et al. 2001; Chambers et al. 2007). Slope, aspect, and soil characteristics modify soil temperature and moisture and influence resistance to cheatgrass at landscape to plant community scales (Chambers et al. 2007; Condon et al. 2011; Reisner et al. 2013). Genetic variation in cheatgrass results in phenotypic traits that increase survival and persistence in populations from a range of environments, and is likely contributing to the recent range expansion of this highly inbreeding species into marginal habitats (Ramakrishnan et al. 2006; Merrill et al. 2012).

The occurrence and persistence of invasive annual grasses in sagebrush habitats is strongly influenced by interactions with the native perennial plant community (fig. 7B). Cheatgrass, a facultative winter annual that can germinate from early fall through early spring, exhibits root elongation at low soil temperatures, and has higher nutrient uptake and growth rates than most native species (Mack and Pyke 1983; Arredondo et al. 1998; James et al. 2011). Seedlings of native, perennial plant species are generally poor competitors with cheatgrass, but adults of native, perennial grasses and forbs, especially those with similar growth forms and phenology, can be highly effective competitors with the invasive annual (Booth et al. 2003; Chambers et al. 2007; Blank and Morgan 2012).

Also, biological soil crusts, which are an important component of plant communities in warmer and drier sagebrush ecosystems, can reduce germination or establishment of cheatgrass (Eckert et al. 1986; Kaltenecker et al. 1999). Disturbances or management treatments that reduce abundance of native perennial plants and biological soil crusts and increase the distances between perennial plants often are associated with higher resource availability and increased competitive ability of cheatgrass (Chambers et al. 2007; Reisner et al. 2013; Roundy et al. *in press*).

The type, characteristics, and natural range of variability of stress and disturbance strongly influence both resilience and resistance (Jackson 2006). Disturbances like overgrazing of perennial plants by livestock, wild horses, and burros and more frequent or more severe fires are typically outside of the natural range of conditions and can reduce the resilience of sagebrush ecosystems. Reduced resilience is triggered by changes in environmental factors like temperature regimes, abiotic attributes like water and nutrient availability, and biotic attributes such as vegetation structure, composition, and productivity (Chambers et al. 2014) and cover of biological soil crusts (Reisner et al. 2013). Resistance to an invasive species can change when changes in abiotic and biotic attributes result in increased resource availability or altered habitat suitability that influences an invasive species' ability to establish and persist and/or compete with native species. Progressive losses of resilience and resistance can result in the crossing of abiotic and/or biotic thresholds and an inability of the system to recover to the reference state (Beisner et al. 2003; Seastedt et al. 2008).

Interactions among disturbances and stressors may have cumulative effects (Chambers et al. 2014). Climate change already may be shifting fire regimes outside of the natural range of occurrence (i.e., longer wildfire seasons with more frequent and longer duration wildfires) (Westerling et al. 2006). Sagebrush ecosystems generally have low productivity, and the largest number of acres burned often occurs a year or two after warm, wet conditions in winter and spring that result in higher fine fuel loads (Littell et al. 2009). Thus, annual grass fire cycles may be promoted by warm, wet winters and a subsequent increase in establishment and growth of invasive winter annuals. These cycles may be exacerbated by rising atmospheric CO_2 concentrations, N deposition, and increases in human activities that result in soil surface disturbance and invasion corridors (Chambers et al. 2014). Modern deviations from historic conditions will likely continue to alter disturbance regimes and sagebrush ecosystem response to disturbances; thus, management strategies that rely on returning to historical or "pre-settlement" conditions may be insufficient, or even misguided, given novel ecosystem dynamics (Davies et al. 2009).

Integrating Resilience and Resistance Concepts With Sage-Grouse Habitat Requirements to Manage Wildfire and Invasive Annual Grass Threats at Landscape Scales

The changes in sagebrush ecosystem dynamics due to invasive annual species and longer, hotter, and drier fire seasons due to a warming climate make it unlikely that these threats can be ameliorated completely (Abatzoglou and Kolden 2011; USFWS 2013). Consequently, a strategic approach is necessary to conserve sagebrush habitat and sage-grouse (Wisdom et al. 2005; Meinke et al. 2009; Wisdom and Chambers 2009; Pyke 2011). This strategic approach requires the ability to (1) identify those locations that provide current or potential habitat for sage-grouse and (2) prioritize management actions based on the capacity of the ecosystem to respond in the desired manner and to effectively allocate resources to achieve desired objectives. Current understanding of the relationship of landscape cover of sagebrush to sage-grouse habitat provides the capacity to identify those locations on the landscape that have a high probability of sage-grouse persistence (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Similarly, knowledge of the relationships of environmental characteristics, specifically soil temperature and moisture regimes, to ecological types and their inherent resilience and resistance gives us the capacity to prioritize management actions based on probable effectiveness of those actions (Wisdom and Chambers 2009; Brooks and Chambers 2011; Miller et al. 2013; Chambers et al. 2014; Chambers et al. *in press*,).

In this section, we discuss the use of landscape cover of sagebrush as an indicator of sage-grouse habitat, and the use of soil temperature and moisture regimes as an indicator of resilience to disturbance, resistance to invasive annual grasses and, ultimately, the capacity to achieve desired objectives. We then show how these two concepts can be coupled in a sage-grouse habitat matrix and used to determine potential management strategies at the landscape scales on which sage-grouse depends.

Landscape Cover of Sagebrush as an Indicator of Sage-Grouse Habitat

Landscape cover of sagebrush is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Landscape cover of sagebrush less than about 25% has a low probability of sustaining active sage-grouse leks (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Above 25% landscape cover of sagebrush, the probability of maintaining active sage-grouse leks increases with increasing sagebrush landscape cover. At landscape cover of sagebrush ranging from 50 to 85%, the probability of sustaining sage-grouse leks becomes relatively constant (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, we use 25% as the level below which there is a low probability of maintaining sage-grouse leks and 65% as the level above which there is little additional increase in the probability of sustaining active leks with further increases of landscape cover of sagebrush (fig. 8; Knick et al. 2013). Between about 25% and 65% landscape sagebrush cover, increases in landscape cover of sagebrush have a constant positive relationship with sage-grouse lek probability (fig. 8; Knick et al. 2013). Restoration and management activities that result in an increase in the amount of sagebrush dominated landscape within areas of pre-existing landscape cover between 25% and 65% likely will result in a higher probability of sage-grouse persistence, while declines in landscape cover of sagebrush likely will result in reductions in sage-grouse (Knick et al. 2013). It is important to note that

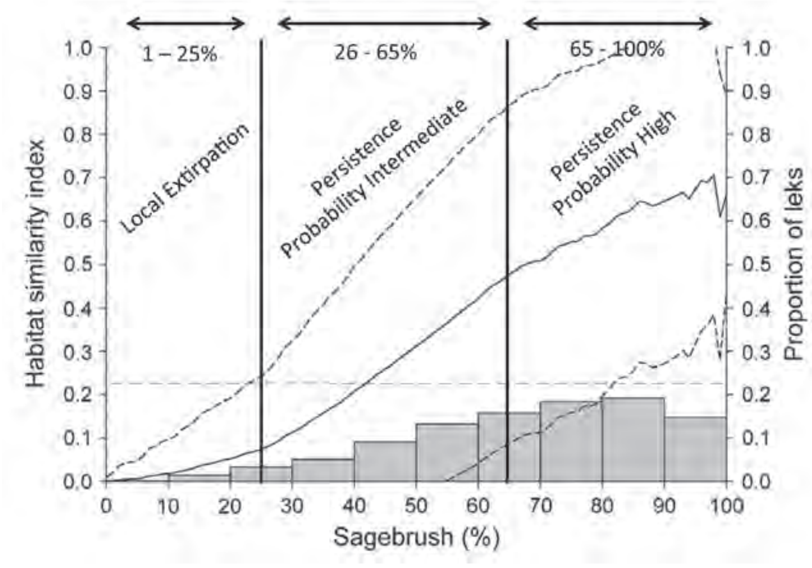


Figure 8. The proportion of sage-grouse leks and habitat similarity index (HSI) as related to the percent landscape cover of sagebrush. The HSI indicates the relationship of environmental variables at map locations across the western portion of the range to minimum requirements for sage-grouse defined by land cover, anthropogenic variables, soil, topography, and climate. HSI is the solid black line ± 1 SD (stippled lines). Proportion of leks are the grey bars. Dashed line indicates HSI values above which characterizes 90% of active leks (0.22). The categories at the top of the figure and the interpretation of lek persistence were added based on Aldridge et al. 2008; Wisdom et al. 2011; and Knick et al. 2013 (figure modified from Knick et al. 2013).

these data and interpretations relate only to persistence (i.e., whether or not a lek remains active) and it is likely that higher proportions of sagebrush cover or improved condition of sagebrush ecosystems may be required for population growth.

For the purposes of delineating sagebrush habitat relative to sage-grouse requirements for landscape cover of sagebrush, we calculated the percentage landscape sagebrush cover within each of the selected categories (1-25%, 26-65%, >65%) for the range of sage-grouse (fig. 9, 10). An explanation of how landscape cover of sagebrush is derived is in Appendix 2. Large areas of landscape sagebrush cover >65% are found primarily in Management Zones (MZ) II (Wyoming Basin), IV (Snake River Plains), and V (Northern Great Basin). In contrast, relatively small areas of landscape sagebrush cover >65% are located in MZ I (Great Plains), III (Southern Great Basin), VI (Columbia Basin), and VII (Colorado Plateau). Sagebrush is naturally less common in the Great Plains region compared to other parts of the range and previous work suggested that sage-grouse populations in MZ I may be more vulnerable to extirpation with further reductions in sagebrush cover (Wisdom et al. 2011). In the western portion of the range, where the threat of invasive annual grasses and wildfire is greatest, the area of sagebrush cover >65% differs among MZs. MZ III is a relatively arid and topographically diverse area in which the greatest extent of sagebrush cover >65% is in higher elevation, mountainous areas. MZs IV and V have relatively large extents of sagebrush cover >65% in relatively cooler and wetter areas, and MZs IV and VI have lower extents of sagebrush cover >65% in warmer and dryer areas and in areas with significant agricultural development. These differences in landscape cover of sagebrush indicate that different sets of management strategies may apply to the various MZs.

Soil Temperature and Moisture Regimes as Indicators of Ecosystem Resilience and Resistance

Potential resilience and resistance to invasive annual grasses reflect the biophysical conditions that an area is capable of supporting. In general, the highest potential resilience and resistance occur with ***cool*** to ***cold*** (frigid to cryic) soil temperature regimes and relatively ***moist*** (xeric to ustic) soil moisture regimes, while the lowest potential resilience and resistance occur with ***warm*** (mesic) soil temperatures and relatively ***dry*** (aridic) soil moisture regimes (Chambers et al. 2014, Chambers et al. *in press*). Definitions of soil temperature and moisture regimes are in Appendix 3. Productivity is elevated by high soil moisture and thus resilience is increased (Chambers et al. 2014); annual grass growth and reproduction is limited by cold soil temperatures and thus resistance is increased (Chambers et al. 2007). The timing of precipitation also is important because cheatgrass and many other invasive annual grasses are particularly well-adapted to Mediterranean type climates with cool and wet winters and warm and dry summers (Bradford and Lauenroth 2006; Bradley 2009). In contrast, areas that receive regular summer precipitation (ustic soil moisture regimes) often are dominated by warm and/or cool season grasses (Sala et al. 1997) that likely create a more competitive environment and result in greater resistance to annual grass invasion and spread (Bradford and Lauenroth 2006; Bradley 2009).

Much of the remaining sage-grouse habitat in MZs I (Great Plains), II (Wyoming Basin), VII (Colorado Plateau), and cool-to-cold or moist sites scattered across the range, are characterized by moderate to high resilience and resistance as indicated by soil temperature and moisture regimes (fig. 11). Sagebrush habitats across MZ I are unique from a range-wide perspective because soils are predominantly cool and ustic, or bordering on ustic as a result of summer precipitation; this soil moisture regime appears to result in higher resilience and resistance (Bradford and Lauenroth 2006).

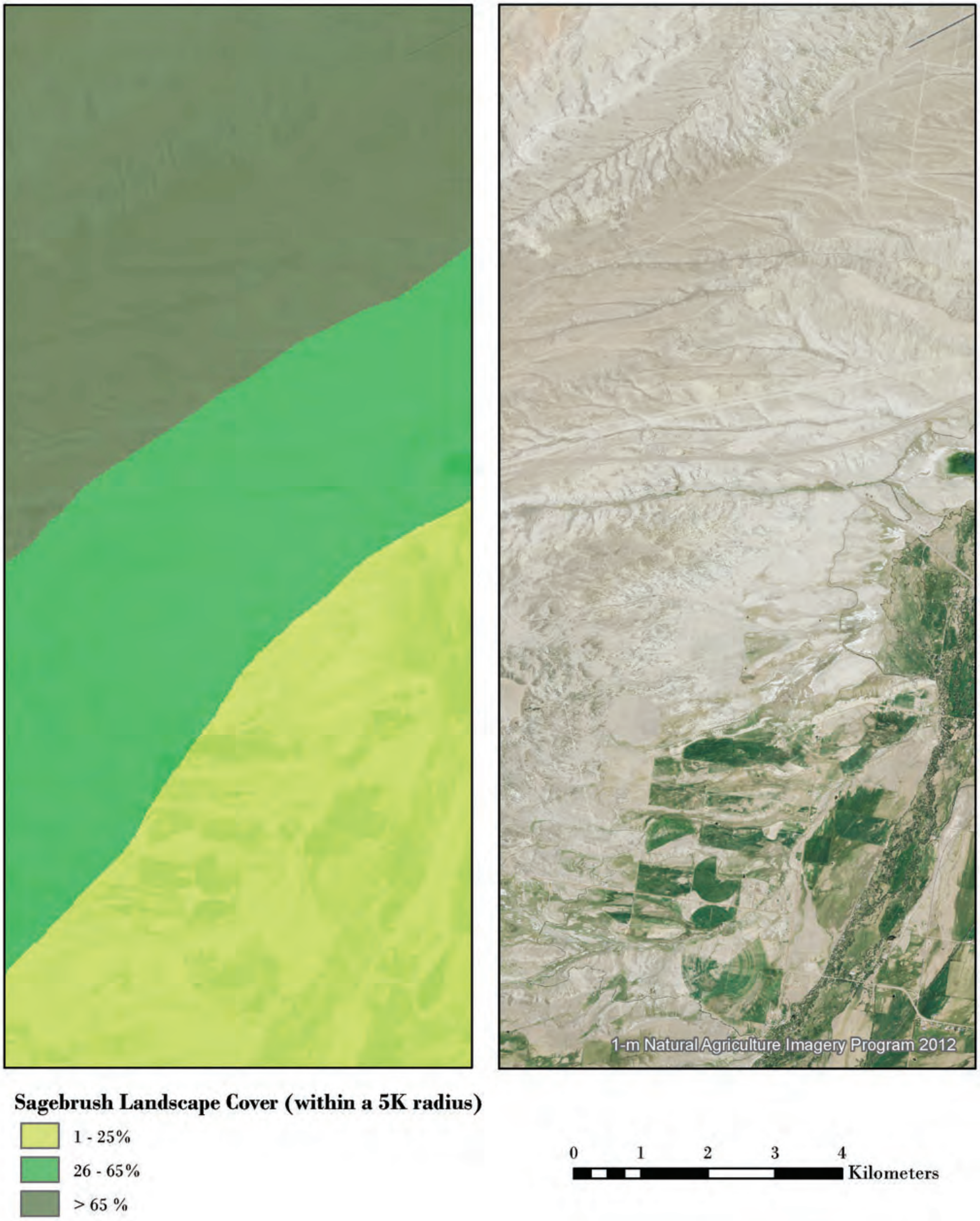


Figure 9. Landscape cover of sagebrush from 1-m National Agricultural Imagery (right) and the corresponding sagebrush landscape cover for the 1-25%, 26-65%, and >65% categories (left). See Appendix 2 for an explanation of how the categories are determined.

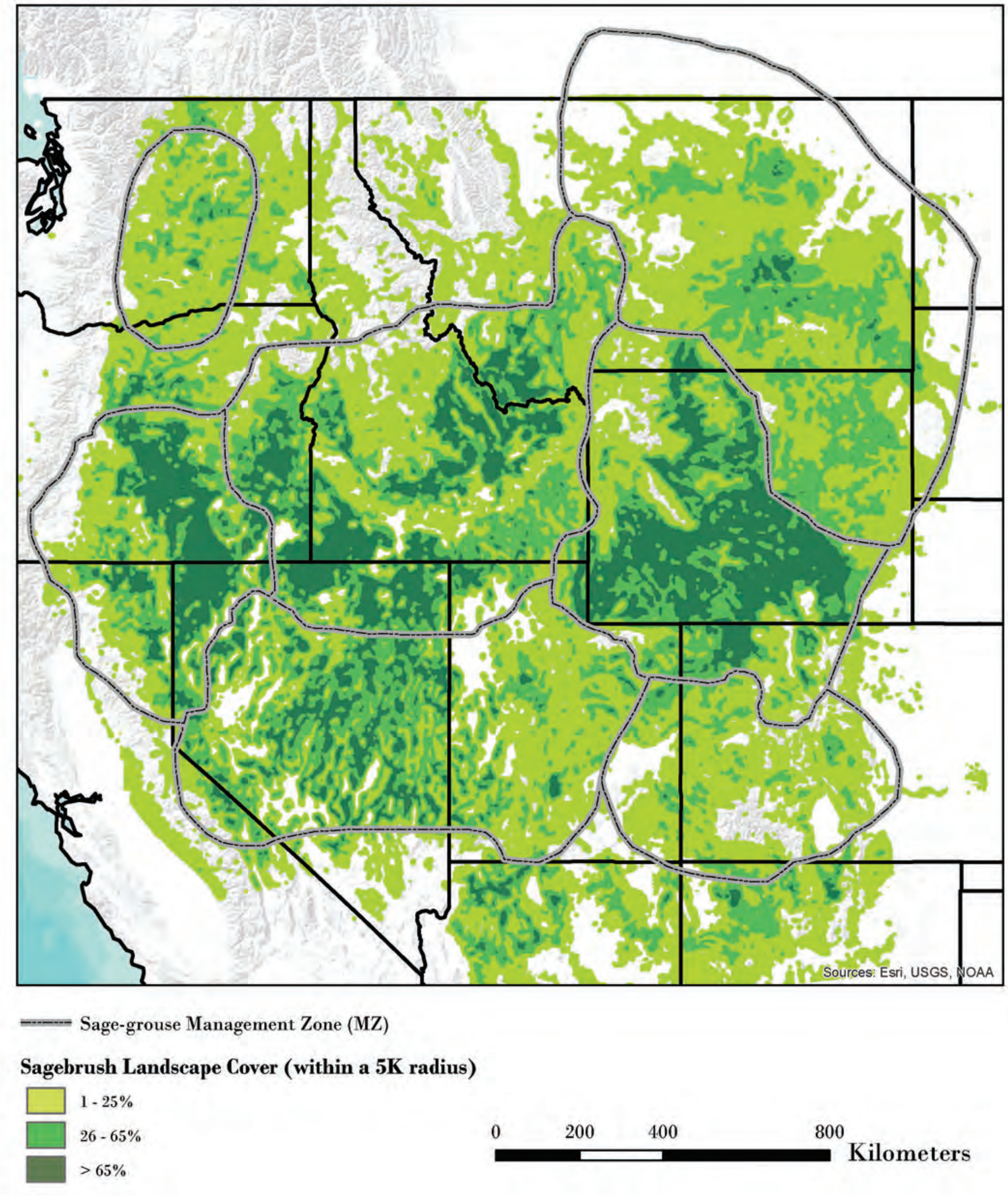


Figure 10. The landscape cover of sagebrush within each of three selected categories (1-25%, 26-65%, >65%) for the range of sage-grouse (Management Zones I – VII; Stiver et al. 2006). The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover.

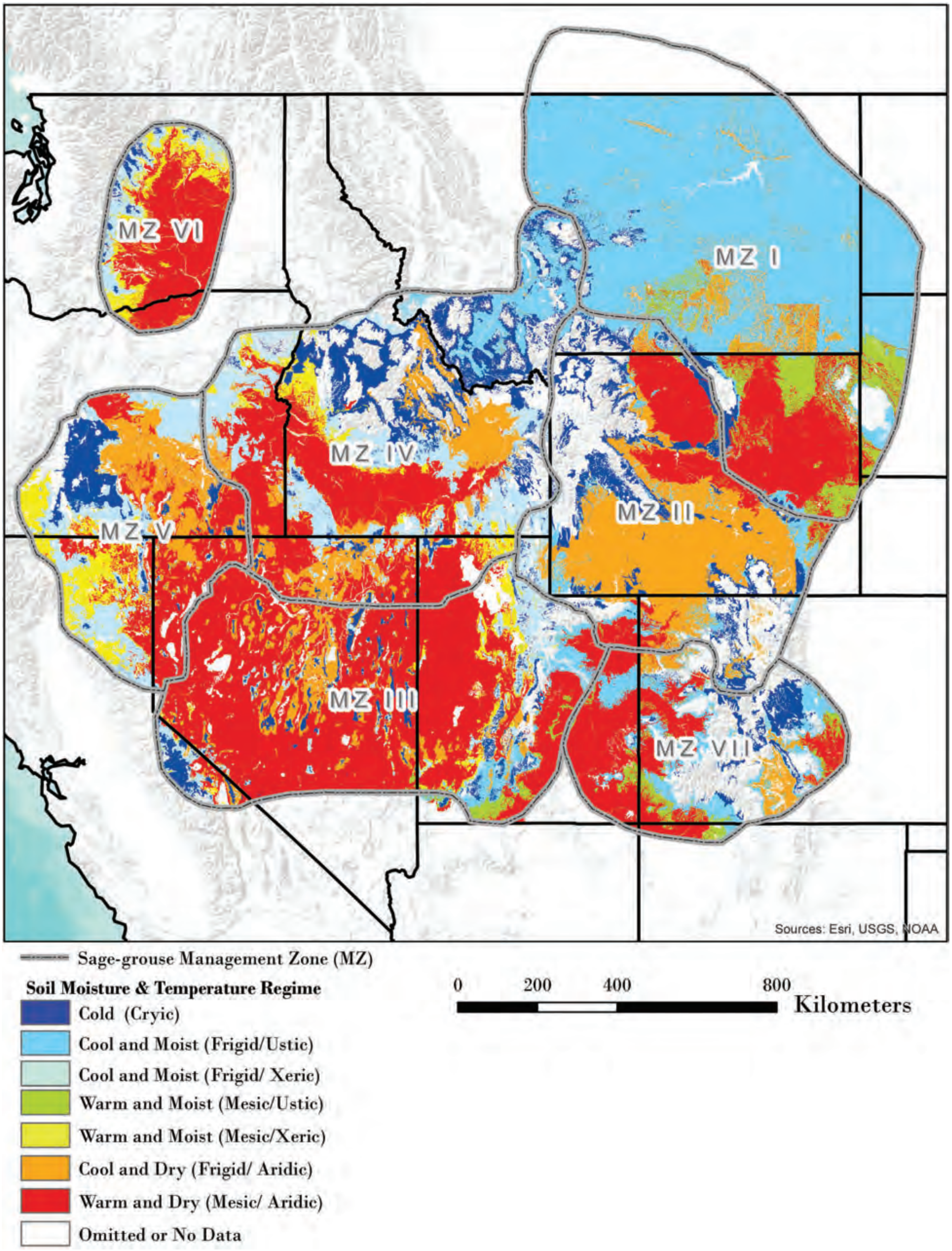


Figure 11. The soil temperature and moisture regimes for the range of sage-grouse (Management Zones I – VII; Stiver et al. 2006). Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b).

However, significant portions of MZs III (Southern Great Basin), much of IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin) are characterized largely by either warm and dry, or warm to cool and moist ecological types with moderate to low resilience and resistance (fig. 11; table 1). Areas within these MZs that have warm and dry soils are typically characterized by Wyoming big sagebrush ecosystems with low to moderately low resilience and resistance and are currently of greatest concern for sage-grouse conservation (fig. 12A). Areas with warm to cool soil temperature regimes and moist precipitation regimes are typically characterized by either Wyoming or mountain big sagebrush, have moderate to moderately low resilience and resistance,

Table 1. Predominant sagebrush ecological types in Sage-Grouse Management Zones III, IV, V, and VI based on soil temperature and soil moisture regimes, typical characteristics, and resilience to disturbance and resistance to invasive annual grasses (modified from Miller et al. 2014 a,b). Relative abundance of sagebrush species and composition of understory vegetation vary depending on Major Land Resource Area and ecological site type.

Ecological type	Characteristics	Resilience and resistance
Cold and Moist (Cryic/Xeric)	Ppt: 14 inches + Typical shrubs: *Mountain big sagebrush, snowfield sagebrush, snowberry, serviceberry, silver sagebrush, and/or low sagebrushes*	*Resilience* – **Moderately high**. Precipitation and productivity are generally high. Short growing seasons can decrease resilience on coldest sites. *Resistance*– **High**. Low climate suitability to invasive annual grasses
Cool and Moist (Frigid/Xeric)	Ppt: 12-22 inches Typical shrubs: *Mountain big sagebrush, antelope bitterbrush, snowberry, and/or low sagebrushes* Piñon pine and juniper potential in some areas	*Resilience* – **Moderately high**. Precipitation and productivity are generally high. Decreases in site productivity, herbaceous perennial species, and ecological conditions can decrease resilience. *Resistance* – **Moderate**. Climate suitability to invasive annual grasses is moderate, but increases as soil temperatures increase.
Warm and Moist (Mesic/Xeric)	Ppt: 12-16 inches Typical shrubs: *Wyoming big sagebrush, mountain big sagebrush, Bonneville big sagebrush, and/or low sagebrushes* Piñon pine and juniper potential in some areas	*Resilience* – **Moderate**. Precipitation and productivity are moderately high. Decreases in site productivity, herbaceous perennial species, and ecological conditions can decrease resilience. *Resistance* – **Moderately low**. Climate suitability to invasive annual grasses is moderately low, but increases as soil temperatures increase.
Cool and Dry (Frigid/Aridic)	Ppt: 6-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush, and/or low sagebrushes*	*Resilience* – **Low**. Effective precipitation limits site productivity. Decreases in site productivity, herbaceous perennial species, and ecological conditions further decrease resilience. *Resistance* – **Moderate**. Climate suitability to invasive annual grasses is moderate, but increases as soil temperatures increase.
Warm and Dry (Mesic/Aridic, bordering on Xeric)	Ppt: 8-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush and/or low sagebrushes*	*Resilience* – **Low.** Effective precipitation limits site productivity. Decreases in site productivity, herbaceous perennial species, and ecological conditions further decrease resilience. Cool season grasses susceptibility to grazing and fire, along with hot dry summer fire conditions, promote cheatgrass establishment and persistence. *Resistance* – **Low.** High climate suitability to cheatgrass and other invasive annual grasses. Resistance generally decreases as soil temperature increases, but establishment and growth are highly dependent on precipitation.

and have the potential for piñon and juniper expansion (Miller et al. 2014a; Chambers et al. *in press*). Many of these areas also are of conservation concern because piñon and juniper expansion and tree infilling can result in progressive loss of understory species and altered fire regimes (Miller et al. 2013). In contrast, areas with cool to cold soil temperature regimes and moist precipitation regimes have moderately high resilience and high resistance and are likely to recover in a reasonable amount of time following wildfires and other disturbances (Miller et al. 2013) (fig. 12B)

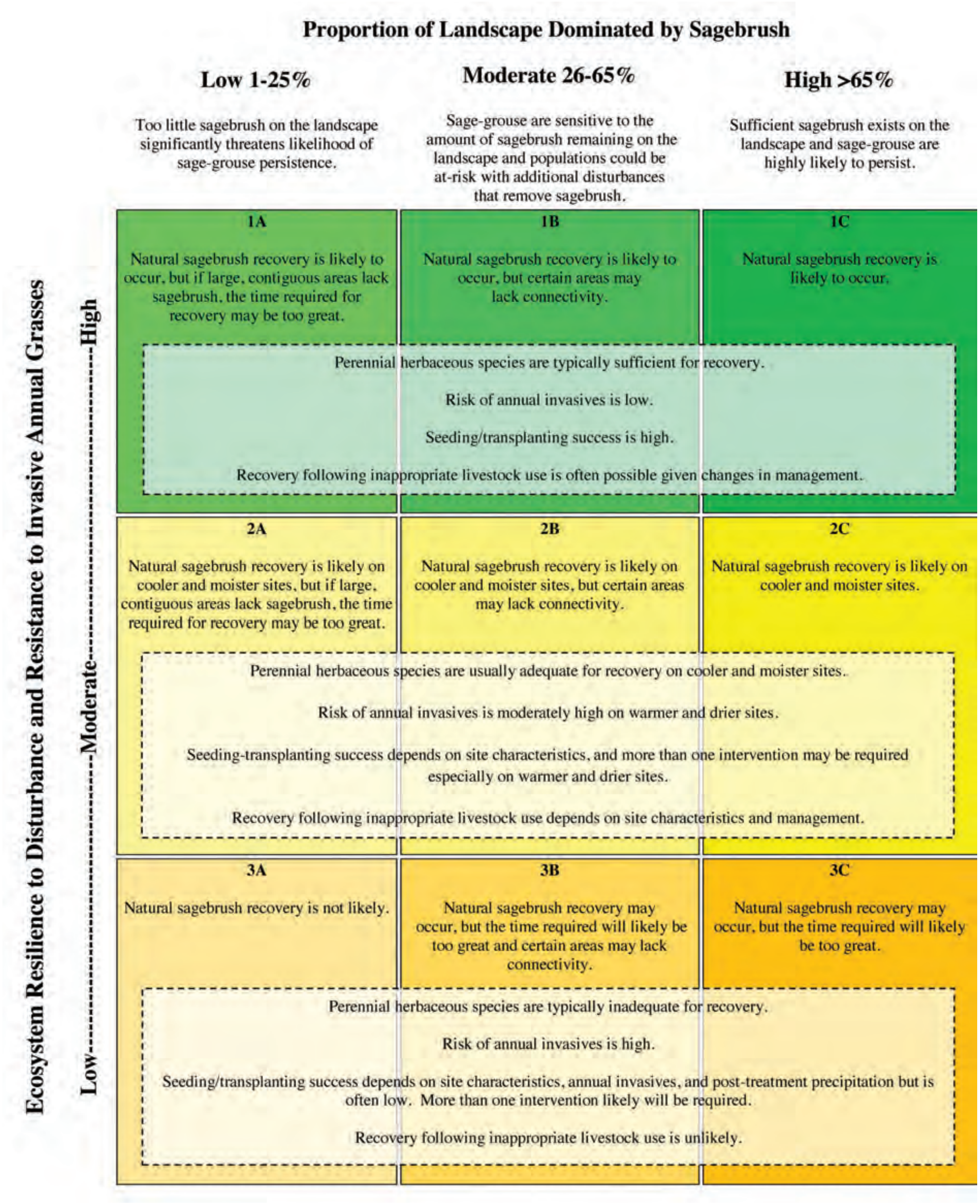
Figure 12. A Wyoming big sagebrush ecosystem with warm and dry soils in southeast Oregon (top) (photo by Richard F. Miller), compared to a mountain big sagebrush ecosystem with cool and moist soils in central Nevada (bottom) (photo by Jeanne C. Chambers).

Management Strategies Based on Landscape Cover of Sagebrush and Ecosystem Resilience and Resistance: The Sage-Grouse Habitat Matrix

Knowledge of the potential resilience and resistance of sagebrush ecosystems can be used in conjunction with sage-grouse habitat requirements to determine priority areas for management and identify effective management strategies at landscape scales (Wisdom and Chambers 2009). The sage-grouse habitat matrix (table 2) illustrates the relative resilience to disturbance and resistance to invasive annual grasses of sagebrush ecosystems in relation to the proportion of sagebrush cover on the landscape. As resilience and resistance go from high to low, as indicated by the rows in the matrix, decreases in sagebrush regeneration and abundance of perennial grasses and forbs progressively limit the capacity of a sagebrush ecosystem to recover after fire or other disturbances. The risk of annual invasives increases and the ability to successfully restore burned or otherwise disturbed areas decreases. As sagebrush cover goes from low to high within these same ecosystems, as indicated by the columns in the matrix, the capacity to provide adequate habitat cover for sage-grouse increases. Areas with less than 25% landscape cover of sagebrush are unlikely to provide adequate habitat for sage-grouse; areas with 26-65% landscape cover of sagebrush can provide habitat for sage-grouse but are at risk if sagebrush loss occurs without recovery; and areas with >65% landscape cover of sagebrush provide the necessary habitat conditions for sage-grouse to persist. Potential landscape scale management strategies can be determined by considering (1) resilience to disturbance, (2) resistance to invasive annuals, and (3) sage-grouse land cover requirements. Overarching management strategies to maintain or increase sage-grouse habitat at landscape scales based on these considerations are conservation, prevention, restoration, and monitoring and adaptive management (table 3; see Chambers et al. 2014). These strategies have been adapted for each of the primary agency programs including fire operations, fuels management, post-fire rehabilitation, and habitat restoration (table 4). Because sagebrush ecosystems occur over continuums of environmental conditions, such as soil temperature and moisture, and have differing land use histories and species composition, careful assessment of the area of concern always will be necessary to determine the relevance of a particular strategy (Pyke 2011; Chambers et al. 2014; Miller et al. 2014 a, b). The necessary information for conducting this type of assessment is found in the "Putting It All Together" section of this report.

Although the sage-grouse habitat matrix (table 2) can be viewed as partitioning land units into spatially discrete categories (i.e., landscapes or portions thereof can be categorized as belonging to one of nine categories), it is not meant to serve as a strict guide to spatial allocation of resources or to prescribe specific management strategies. Instead, the matrix should serve as a decision support tool for helping managers implement strategies that consider both the resilience and resistance of the landscape and landscape sagebrush cover requirements of sage-grouse. For example, low elevation Wyoming big sagebrush plant communities with relatively low resilience and resistance may provide important winter habitat resources for a given sage-grouse population. In a predominantly Wyoming big sagebrush area comprised of relatively low sagebrush landscape cover, a high level of management input may be needed to realize conservation benefits for sage-grouse. This doesn't mean that management activities should not be undertaken if critical or limiting sage-grouse habitat resources are present, but indicates that inputs will be intensive, potentially more expensive, and less likely to succeed relative to more resilient landscapes. It is up to the user of the matrix to determine how such tradeoffs influence management actions.

Table 2. Sage-grouse habitat matrix based on resilience and resistance concepts from Chambers et al. 2014, and sage-grouse habitat requirements from Aldridge et al. 2008, Wisdom et al. 2011, and Knick et al. 2013. Rows show the ecosystems relative resilience to disturbance and resistance to invasive annual grasses derived from the sagebrush ecological types in table 1 (1 = high resilience and resistance; 2 = moderate resilience and resistance; 3 = low resilience and resistance). Columns show the current proportion of the landscape (5-km rolling window) dominated by sagebrush (A = 1-25% land cover; B = 26-65% land cover; 3 = >65% land cover). Use of the matrix is explained in text. Overarching management strategies that consider resilience and resistance and landscape cover of sagebrush are in table 3. Potential management strategies specific to agency program areas, including fire operations, fuels management, post-fire rehabilitation, and habitat restoration are in table 4.



Proportion of Landscape Dominated by Sagebrush

Ecosystem Resilience and Resistance to Invasive Annual Grasses	Low 1-25%	Moderate 26-65%	High >65%
	Too little sagebrush on the landscape significantly threatens likelihood of sage-grouse persistence.	Sage-grouse are sensitive to the amount of sagebrush remaining on the landscape and populations could be at-risk with additional disturbances that remove sagebrush.	Sufficient sagebrush exists on the landscape and sage-grouse are highly likely to persist.
High	1A Natural sagebrush recovery is likely to occur, but if large, contiguous areas lack sagebrush, the time required for recovery may be too great.	1B Natural sagebrush recovery is likely to occur, but certain areas may lack connectivity.	1C Natural sagebrush recovery is likely to occur.
	Perennial herbaceous species are typically sufficient for recovery. Risk of annual invasives is low. Seeding/transplanting success is high. Recovery following inappropriate livestock use is often possible given changes in management.		
Moderate	2A Natural sagebrush recovery is likely on cooler and moister sites, but if large, contiguous areas lack sagebrush, the time required for recovery may be too great.	2B Natural sagebrush recovery is likely on cooler and moister sites, but certain areas may lack connectivity.	2C Natural sagebrush recovery is likely on cooler and moister sites.
	Perennial herbaceous species are usually adequate for recovery on cooler and moister sites. Risk of annual invasives is moderately high on warmer and drier sites. Seeding-transplanting success depends on site characteristics, and more than one intervention may be required especially on warmer and drier sites. Recovery following inappropriate livestock use depends on site characteristics and management.		
Low	3A Natural sagebrush recovery is not likely.	3B Natural sagebrush recovery may occur, but the time required will likely be too great and certain areas may lack connectivity.	3C Natural sagebrush recovery may occur, but the time required will likely be too great.
	Perennial herbaceous species are typically inadequate for recovery. Risk of annual invasives is high. Seeding/transplanting success depends on site characteristics, annual invasives, and post-treatment precipitation but is often low. More than one intervention likely will be required. Recovery following inappropriate livestock use is unlikely.		

Table 3. Potential management strategies based on resilience to disturbance, resistance to annual grass invasion, and sage-grouse habitat requirements based on Aldridge et al. 2008; Wisdom et al. 2011; and Knick et al. 2013 (adapted from Chambers et al. 2014).

Conserve – maintain or increase resilience to disturbance and resistance to invasive annuals in areas with high conservation value	
Priorities	• Ecosystems with low to moderate resilience to fire and resistance to invasive species that still have large patches of landscape sagebrush cover and adequate perennial grasses and forbs – *ecological types with warm and dry and cool and dry soil temperature/moisture regimes.* • Ecosystems with a high probability of providing habitat for sage-grouse, especially those with >65% landscape cover of sagebrush and adequate perennial herbaceous species – *all ecological types.*
Objective	• Minimize impacts of current and future human-caused disturbances and stressors.
Activities	• Immediately suppress fire in moderate to low resilience and resistance sagebrush and wooded shrublands to prevent an invasive annual grass-fire cycle. Large sagebrush patches are high priority for protection from wildfires. • Implement strategic fuel break networks to provide anchor points for suppression and reduce losses when wildfires escape initial attack. • Manage livestock grazing to prevent loss of perennial native grasses and forbs and biological soil crusts and allow natural regeneration. • Limit anthropogenic activities that cause surface disturbance, invasion, and fragmentation. (e.g., road and utility corridors, urban expansion, OHV use, and mineral/energy projects). • Detect and control new weed infestations.
Prevent – maintain or increase resilience and resistance of areas with declining ecological conditions that are at risk of conversion to a degraded, disturbed, or invaded state	
Priorities	• Ecosystems with moderate to high resilience and resistance – *ecological types with relatively cool and moist soil temperature and moisture regimes*. ○ Prioritize landscape patches that exhibit declining conditions due to annual grass invasion and/or tree expansion (e.g., at risk phase in State and Transition Models). • Ecosystems with a moderate to high probability of providing sage-grouse habitat, especially those with 26-65% landscape cover of sagebrush and adequate perennial native grasses and forbs – *all ecological types*.
Objectives	• Reduce fuel loads and decrease the risk of high intensity and high severity fire. • Increase abundance of perennial native grasses and forbs and of biological soil crusts where they naturally occur. • Decrease the longer-term risk of annual invasive grass dominance.
Activities	• Use mechanical treatments like cut and leave or mastication to remove trees, decrease woody fuels, and release native grasses and forbs in warm and moist big sagebrush ecosystems with relatively low resistance to annual invasive grasses that are in the early to mid-phase of piñon and/or juniper expansion. • Use prescribed fire or mechanical treatments to remove trees, decrease woody fuels, and release native grasses and forbs in cool and moist big sagebrush ecosystems with relatively high resistance to annual invasive grass that are in early to mid-phase of piñon and/or juniper expansion. • Actively manage post-treatment areas to increase perennial herbaceous species and minimize secondary weed invasion. • Consider the need for strategic fuel breaks to help constrain fire spread or otherwise augment suppression efforts.
Restore – increase resilience and resistance of disturbed, degraded, or invaded areas	

Priorities	• Areas burned by wildfire – *all ecological types*
	  ○ Prioritize areas with low to moderate resilience and resistance, and that have a reasonable expectation of recovery.
	  ○ Prioritize areas where perennial grasses and forbs have been depleted.
	  ○ Prioritize areas that experienced high severity fire.

(continued)

Table 3. (Continued).

	• Sage-grouse habitat – *all ecological types* ○ Prioritize areas where restoration of sagebrush and/or perennial grasses is needed to create large patches of landscape cover of sagebrush or connect existing patches of sagebrush habitat. ○ Prioritize areas with adequate landscape cover of sagebrush where restoration of perennial grasses and forbs is needed. • Areas affected by anthropogenic activities that cause surface disturbance, invasion, and fragmentation. (e.g., road and utility corridors, urban expansion, OHV use, and mineral/energy projects) – *all ecological types.*
Objectives	• Increase soil stability and curtail dust. • Control/suppress invasive annual grasses and other invasive plants. • Increase landscape cover of sagebrush. • Increase perennial grasses and forbs and biological soil crusts where they naturally occur. • Reduce the risk of large fires that burn sage-grouse habitat.
Activities	• Use integrated strategies to control/suppress annual invasive grass and other annual invaders. • Establish and maintain fuel breaks or greenstrips in areas dominated by invasive annual grasses that are adjacent to areas with >25% landscape sagebrush cover and adequate perennial native grasses and forbs. • Seed perennial grasses and forbs that are adapted to local conditions to increase cover of these species in areas where they are depleted. • Seed and/or transplant sagebrush to restore large patches of sagebrush cover and connect existing patches. • Repeat restoration treatments if they fail initially to ensure restoration success especially in warm and dry soil temperature moisture regimes where weather is often problematic for establishment. • Actively manage restored/rehabilitated areas to increase perennial herbaceous species and minimize secondary weed invasion.
Monitoring and Adaptive Management– implement comprehensive monitoring to track landscape change and management outcomes and provide the basis for adaptive management	
Priorities	• Regional environmental gradients to track changes in plant community and other ecosystem attributes and expansion or contraction of species ranges – *all ecological types.* • Assess treatment effectiveness – *all ecological types.*
Objectives	• Understand effects of wildfire, annual grass invasion, piñon and juniper expansion, climate change and other global stressors in sagebrush ecosystems • Increase understanding of the long- and short-term outcomes of management treatments.
Activities	• Establish a regional network of monitoring sites that includes major environmental gradients. • Collect pre- and post-treatment monitoring data for all major land treatments activities. • Collect data on ecosystem status and trends (for example, land cover type, ground cover, vegetation cover and height [native and invasive], phase of tree expansion, soil and site stability, oddities). • Use consistent methods to monitor indicators. • Use a cross-boundary approach that involves all major land owners. • Use a common data base for all monitoring results (e.g., Land Treatment Digital Library; http://greatbasin.wr.usgs.gov/ltdl/). • Develop monitoring products that track change and provide management implications and adaptations for future management. • Support and improve information sharing on treatment effectiveness and monitoring results across jurisdictional boundaries (e.g., Great Basin Fire Science Delivery Project; www.gbfiresci.org).

Table 4. Specific management strategies by agency program area for the cells within the sage-grouse habitat matrix (table 2). The rows indicate relative resilience and resistance (numbers) and the columns indicate landscape cover of sagebrush by category (letters). Resilience and resistance are based on soil temperature and moisture regimes (fig. 11) and their relationship to ecological types (table 1). Percentage of the landscape dominated by sagebrush is based on the capacity of large landscapes to support viable sage-grouse populations over the long term (fig. 8). Note that these guidelines are related to the sage-grouse habitat matrix, and do not preclude other factors from consideration when determining management priorities for program areas. The "Fire Operations" program area includes preparedness, prevention, and suppression activities.

High Resilience to Disturbance and Resistance to Invasive Annual Grasses (1A, 1B, 1C)

Natural sagebrush recovery is likely to occur. Perennial herbaceous species are sufficient for recovery. Risk of invasive annual grasses is typically low.

Fire Operations	• Fire suppression is typically third order priority, but varies with large fire risk and landscape condition (cells 1A, 1B, 1C). Scenarios requiring higher priority may include: ○ Areas of sagebrush that bridge large, contiguous expanses of sagebrush and that are important for providing connectivity for sage-grouse (cells 1B, 1C). ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 1A, 1B, 1C) ○ Areas with later phase (Phase III) post-settlement piñon and juniper that have high resistance to control, are subject to large and/or severe fires, and place adjacent sage-grouse habitat at risk (cells 1A, 1B). ○ All areas when critical burning environment conditions exist. These conditions may be identified by a number of products including, but not limited to: Predictive Services 7-Day Significant Fire Potential Forecasts; National Weather Service Fire Weather Watches and Red Flag Warnings; fire behavior forecasts or other local knowledge.
Fuels Management	• Fuels management to reduce large sagebrush stand losses is a second order priority, especially in cells 1B and 1C. Management activities include: ○ Strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Tree removal in early to mid-phase (Phases I, II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads. ○ Tree removal in later phase (Phase III), post-settlement piñon and juniper areas to reduce risks of large or high severity fires. Because these areas represent non-sage-grouse habitat, prescribed fire may be appropriate on cool and moist sites, but invasive plant control and restoration of sagebrush and perennial native grasses and forbs may be necessary.
Post-Fire Rehabilitation	• Post-fire rehabilitation is generally low priority (cells 1A, 1B, 1C). Areas of higher priority include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Steep slopes and soils with erosion potential.
Habitat Restoration and Recovery	• Restoration is typically passive and designed to increase or maintain perennial herbaceous species, biological soil crusts and landscape cover of sagebrush (cells 1A, 1B, 1C). Areas to consider for active restoration include: ○ Areas where perennial herbaceous cover density, or composition is inadequate for recovery after surface disturbance. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse.

Moderate Resilience to Disturbance and Resistance to Invasive Annuals (2A, 2B, 2C)

Natural sagebrush recovery is likely to occur on cooler and moister sites, but the time required may be too great if large, contiguous areas lack sagebrush. Perennial herbaceous species are usually adequate for recovery on cooler and moister sites. Risk of invasive annual grasses is moderately high on warmer and drier sites.

Fire Operations	• Fire suppression is typically second order priority (cells 2A, 2B, 2C). Scenarios requiring higher priority may include: ○ Areas of sagebrush that bridge large, contiguous expanses of sagebrush and that are important for providing connectivity for sage-grouse (cells 2B, 2C).

(continued)

Table 4. (Continued).

	○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 2A, 2B, 2C) ○ Areas with later phase (Phase III), post-settlement piñon and juniper that have high resistance to control, are subject to large and/or severe fires, and place adjacent sage-grouse habitat at risk (cells 2A, 2B). ○ Areas where annual grasslands place adjacent sage-grouse habitat at risk (cell 2A). ○ All areas when critical burning environment conditions exist. These conditions may be identified by a number of products including, but not limited to: Predictive Services 7-Day Significant Fire Potential Forecasts; National Weather Service Fire Weather Watches and Red Flag Warnings; fire behavior forecasts or other local knowledge.
Fuels Management	• Fuels management to reduce large sagebrush stand losses is a first order priority, especially in cells 2B and 2C. Management activities include: ○ Strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Tree removal in early to mid-phase (Phase I, II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads. ○ Tree removal in later phase (Phase III), post-settlement piñon and juniper areas to reduce risks of large or high severity fires. Because these areas represent non-sage-grouse habitat, prescribed fire may be appropriate on cool and moist sites, but restoration of sagebrush and perennial native grasses and forbs may be necessary.
Post-Fire Rehabilitation	• Post-fire rehabilitation is generally low priority (cells 2A, 2B, 2C) in cooler and moister areas. Areas of higher priority include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Relatively warm and dry areas where annual invasives are expanding. ○ Steep slopes with erosion potential.
Habitat Restoration and Recovery	• Restoration is typically passive on cooler and moister areas and is designed to increase or maintain perennial herbaceous species, biological soil crusts, and landscape cover of sagebrush (cells 2A, 2B, 2C). Areas to consider for active restoration include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery after surface disturbance. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Relatively warm and dry areas where annual invasives are expanding.

Low Resilience to Disturbance and Resistance to Invasive Annuals (3A, 3B, 3C)

Natural sagebrush recovery is not likely. Perennial herbaceous species are typically inadequate for recovery. Risk of invasive annual grasses is high.

Fire Operations	• Fire suppression priority depends on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). These areas may be a higher priority if they are adjacent to intact sage-grouse habitat or are essential for connectivity. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). These areas are higher priority if they have intact understories and if they are adjacent to sage-grouse habitat. ○ Areas with >65% landscape cover of sagebrush are first order priority (cell 3C). ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 3A, 3B, 3C).

(continued)

Table 4. (Continued).

Fuels Management	• Fuels management priority and management activities depend on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). Strategic placement of fuel breaks may be needed to reduce loss of adjacent sage-grouse habitat by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). These areas are higher priority if they have intact understories and if they are adjacent to sage-grouse habitat. Strategic placement of fuel breaks may be needed to reduce loss of large sagebrush stands by wildfire. ○ Areas with >65% landscape cover of sagebrush are first order priority (cell 3C). Strategic placement of fuel breaks may be needed to reduce loss of large sagebrush stands by wildfire. ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 3A, 3B, 3C). Strategic placement of fuel breaks may be needed to protect investments from repeated loss to wildfire.
Post-Fire Rehabilitation	• Post-fire rehabilitation priority and management activities depend on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). Exceptions include (1) sites that are relatively cool and moist and (2) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. In highly invaded areas, integrated strategies that include seeding of perennial herbaceous species and seeding and/or transplanting sagebrush will be required. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). Exceptions include (1) sites that are relatively cool and moist or that are not highly invaded, and (2) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. Seeding of perennial herbaceous species will be required where cover, density and species composition of these species is inadequate for recovery. Seeding and/or transplanting sagebrush as soon as possible is necessary for rehabilitating sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with >65% landscape cover of sagebrush are first order priority, especially if they are part of a larger, contiguous area of sagebrush (cell 3C). Seeding of perennial herbaceous species will be required where cover, density and species composition of these species is inadequate for recovery. Seeding and/or transplanting sagebrush as soon as possible is necessary for rehabilitating sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation.
Habitat Restoration and Recovery	• Restoration priority and management activities depends on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority. Exceptions include (1) surface disturbances and (2) areas adjacent to sage-grouse habitat where seeding can be used to prevent annual invasive spread (cell 3A). In highly invaded areas, integrated strategies that include seeding of perennial herbaceous species and seeding and/or transplanting sagebrush will be required. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). Exceptions include (1) surface disturbances, (2) sites that are relatively cool and moist or that are not highly invaded, and (3) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. Seeding of perennial herbaceous species may be required where cover, density and species composition of these species is inadequate. Seeding and/or transplanting sagebrush as soon as possible is necessary for restoring sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with >65% landscape cover of sagebrush are first order priority, especially if they are part of a larger, contiguous area of sagebrush (cell 3C). Seeding of perennial herbaceous species may be required where cover, density, and species composition of these species is inadequate. Seeding and/or transplanting sagebrush as soon as possible is necessary for restoring sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation.

Another important consideration is that ecological processes such as wildfire can occur either within or across categories in the sage-grouse habitat matrix and it is necessary to determine the appropriate spatial context when evaluating management opportunities based on resilience and resistance and sage-grouse habitat. For example, if critical sage-grouse habitat occurs in close proximity to landscapes comprised mainly of annual grass-dominated plant communities, then fire risk to adjacent sage-grouse habitat can increase dramatically (Balch et al. 2013). In this scenario, management actions could include reducing the influence of invasive annual grasses with a strategic fuel break on the perimeter of intact sagebrush. Thus, management actions may have value to sustaining existing sage-grouse habitat, even if these measures are applied in locations that are currently not habitat; the spatial relationships of sagebrush and invasive annual grasses should be considered when prioritizing management actions and associated conservation measures.

Informing Wildfire and Fuels Management Strategies to Conserve Sage-Grouse

Collectively, responses to wildfires and implementation of fuels management projects are important contributors to sage-grouse conservation. Resilience and resistance concepts provide a science-based background that can inform fire operations and fuels management strategies and allocation of scarce assets during periods of high fire activity. In fire operations, firefighter and public safety is the overriding objective in all decisions. In addition, land managers consider numerous other values at risk, including the Wildland-Urban Interface (WUI), habitats, and infrastructure when allocating assets and prioritizing efforts. Resilience and resistance concepts are especially relevant for evaluating tradeoffs related to current ecological conditions and rates of recovery and possible ecological consequences of different fire management activities. For example, prioritizing initial attack efforts based on ecological types and their resilience and resistance at fire locations is a possible future application of resilience and resistance concepts. Also, fire prevention efforts can be concentrated where human ignitions have commonly occurred near intact, high quality habitats that also have inherently low resilience and resistance.

Fuels management projects are often applied to (1) constrain or minimize fire spread; (2) alter species composition; (3) modify fire intensity, severity, or effects; or (4) create fuel breaks or anchor points that augment fire management efforts (fig. 13). These activities are selectively used based on the projected ecosystem response, anticipated fire patterns, and probability of success. For example, in areas that are difficult to restore due to low to moderate resilience, fuel treatments can be placed to minimize fire spread and conserve sagebrush habitat. In cooler and moister areas with moderate to high resilience and resistance, mechanical or prescribed fire treatments may be appropriate to prevent conifer expansion and dominance. Given projected climate change and longer fire seasons across the western United States, fuels management represents a proactive approach for modifying large fire trends. Fire operations and fuels management programs contribute to a strategic, landscape approach when coupled with data that illustrate the likelihood of fire occurrence, potential fire behavior, and risk assessments (Finney et al. 2010; Oregon Department of Forestry 2013). In tandem with resilience and resistance concepts, these data can further inform fire operations and fuels management decisions.

Figure 13. Fuel breaks may include roads, natural features, or other management imposed treatments intended to modify fire behavior or otherwise augment suppression efforts at the time of a fire. Such changes in fuel type and arrangement may improve suppression effectiveness by modifying flame length and fire intensity, and allow fire operations to be conducted more safely. The top photo shows a burnout operation along an existing road to remove available fuels ahead of an oncoming fire and constrain overall fire growth (photo by BLM Idaho Falls District). The bottom photo shows fuel breaks located along a road, which complimented fire control efforts when a fire intersected the fuel break and road from the right (photo by Ben Dyer, BLM).

Putting it all Together

Effective management and restoration of sage-grouse habitat will benefit from a collaborative approach that prioritizes the best management practices in the most appropriate places. This section describes an approach for assessing focal areas for sage-grouse habitat management based on widely available data, including (1) Priority Areas for Conservation (PACs), (2) breeding bird densities, (3) habitat suitability as indicated by the landscape cover of sagebrush, (4) resilience and resistance and dominant ecological types as indicated by soil temperature and moisture regimes, and (5) habitat threats as indicated by cover of cheatgrass, cover of piñon and juniper, and by fire history. Breeding bird density data are overlain with landscape cover of sagebrush and with resilience and resistance to spatially link sage-grouse populations with habitat conditions and risks. We illustrate the use of this step-down approach for evaluating focal areas for sage-grouse habitat management across the western portion of the range, and we provide a detailed example for a diverse area in the northeast corner of Nevada that is comprised largely of PACs with mixed land ownership. The sage-grouse habitat matrix (table 2) is used as a tool in the decision process, and guidelines are provided to assist in determining appropriate management strategies for the primary agency program areas (fire operations, fuels management, post-fire rehabilitation, habitat restoration) for each cell of the matrix.

We conclude with discussions of the tools available to aid in determining the suitability of an area for treatment and the most appropriate management treatments such as ecological site descriptions and state and transition models and of monitoring and adaptive management. Datasets used to compile the maps in the following sections are in Appendix 4.

Assessing Focal Areas for Sage-Grouse Habitat Management: Key Data Layers

Priority areas for conservation: The recent identification of sage-grouse strongholds, or Priority Areas for Conservation (PACs), greatly improves the ability to target management actions towards habitats expected to be critical for long-term viability of the species (fig. 14; USFWS 2013). Understanding and minimizing risks of large-scale loss of sagebrush and conversion to invasive annual grasses or piñon and juniper in and around PACs will be integral to maintaining sage-grouse distribution and stabilizing population trends. PACs were developed by individual states to identify those areas that are critical for ensuring adequate representation, redundance, and resilience to conserve sage-grouse populations. Methods differed among states; in general, PAC boundaries were identified based on (1) sage-grouse population data including breeding bird density, lek counts, telemetry, nesting areas, known distributions, and sightings/observations; and (2) habitat data including occupied habitat, suitable habitat, seasonal habitat, nesting and brood rearing areas, and connectivity areas or corridors. Sage-grouse habitats outside of PACs also are important in assessing focal areas for management where they provide connectivity between PACs (genetic and habitat linkages), seasonal habitats that may have been underestimated due to emphasis on lek sites to define priority areas, habitat restoration and population expansion opportunities, and flexibility for managing habitat changes that may result from climate change (USFWS 2013). If PAC boundaries are adjusted, they will need to be updated for future analyses.

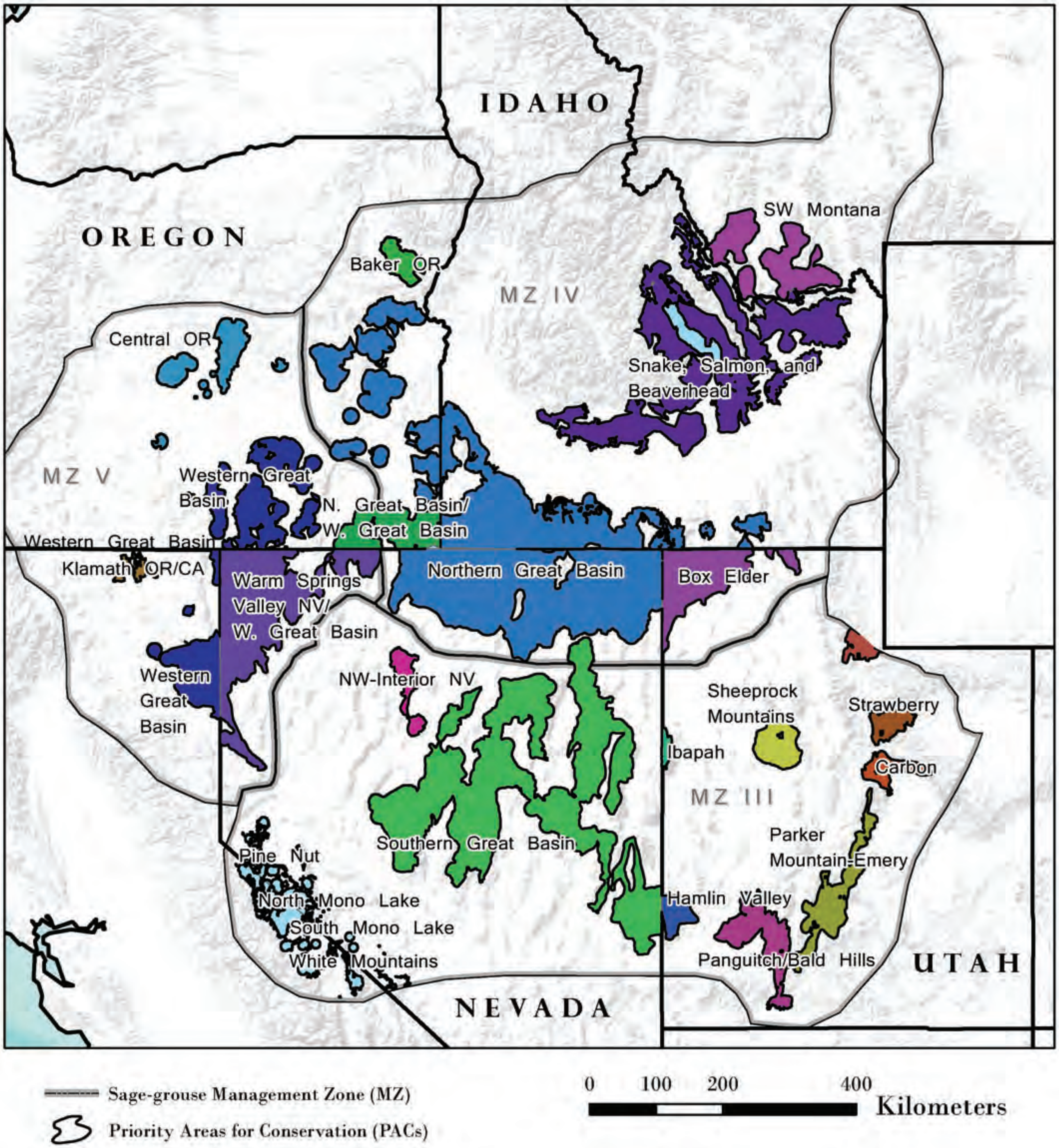


Figure 14. Priority Areas for Conservation (PACs) within the range of sage-grouse (USFWS 2013). Colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Breeding bird density: Range-wide breeding bird density areas provide one of the few accessible data sets for further prioritizing actions within and adjacent to PACs to maintain species distribution and abundance. Doherty et al. (2010b) developed a useful framework for incorporating population data in their range-wide breeding bird density analysis, which used maximum counts of males on leks (n = 4,885) to delineate breeding bird density areas that contain 25, 50, 75, and 100% of the known breeding population (fig. 15). Leks were mapped according to these abundance values and buffered by a 6.4 to 8.5 km (4.0 to 5.3 mi) radius to delineate nesting areas. Findings showed that while sage-grouse occupy extremely large landscapes, their breeding distribution is highly aggregated in comparably smaller identifiable population centers; 25% of the known population occurs within 3.9% (2.9 million ha; 7.2 million ac) of the species range, and 75% of birds are within 27.0% of the species range (20.4 million ha; 50.4 million ac) (Doherty et al. 2010b). The Doherty et al. (2010b) analysis emphasized breeding habitats primarily because little broad scale data exist for summer and winter habitat use areas. Even though the current breeding bird density data provide the most comprehensive data available, they do not include all existing sage-grouse populations. Incorporating finer scale seasonal habitat use data at local levels where it is available will ensure management actions encompass all seasonal habitat requirements.

For this assessment, we chose to use State-level breeding bird density results from Doherty et al. (2010b) instead of range-wide model results to ensure that important breeding areas in MZs III, IV, and V were not underweighted due to relatively higher bird densities in the eastern portion of the range. It is important to note that breeding density areas were identified using best available information in 2009, so these range-wide data do not reflect the most current lek count information or changes in conditions since the original analysis. Also, breeding density areas should not be viewed as rigid boundaries but rather as the means to prioritize landscapes regionally where step-down assessments and actions may be implemented quickly to conserve the most birds.

Landscape cover of sagebrush: Landscape cover of sagebrush is one of the key determinants of sage-grouse population persistence and, in combination with an understanding of resilience to disturbance and resistance to invasive annuals, provides essential information both for determining priority areas for management and appropriate management actions (fig. 10; tables 2 and 3). Landscape cover of sagebrush is a measure of large, contiguous patches of sagebrush on the landscape and is calculated from remote sensing databases such as LANDFIRE (see Appendix 4). We used the three cover categories of sagebrush landscape cover discussed previously to predict the likelihood of sustaining sage-grouse populations (1-25%, 25-65%, >65%). The sagebrush landscape cover datasets were created using a moving window to summarize the proportion of area (5-km [3.1-mi] radius) dominated by sagebrush surrounding each 30-m pixel and then assigned those areas to the three categories (see Appendix 2). Because available sagebrush cover from sources such as LANDFIRE does not exclude recent fire perimeters, it was necessary to either include these in the analysis of landscape cover of sagebrush or display them separately. Although areas that have burned since 2000 likely do not currently provide desired sage-grouse habitat, areas with the potential to support sagebrush ecological types can provide conservation benefits in the overall planning effort especially within long-term conservation areas like PACs. The landscape cover of sagebrush and recent fire perimeters are illustrated for the western portion of the range (fig.16) and northeast Nevada (fig. 17).

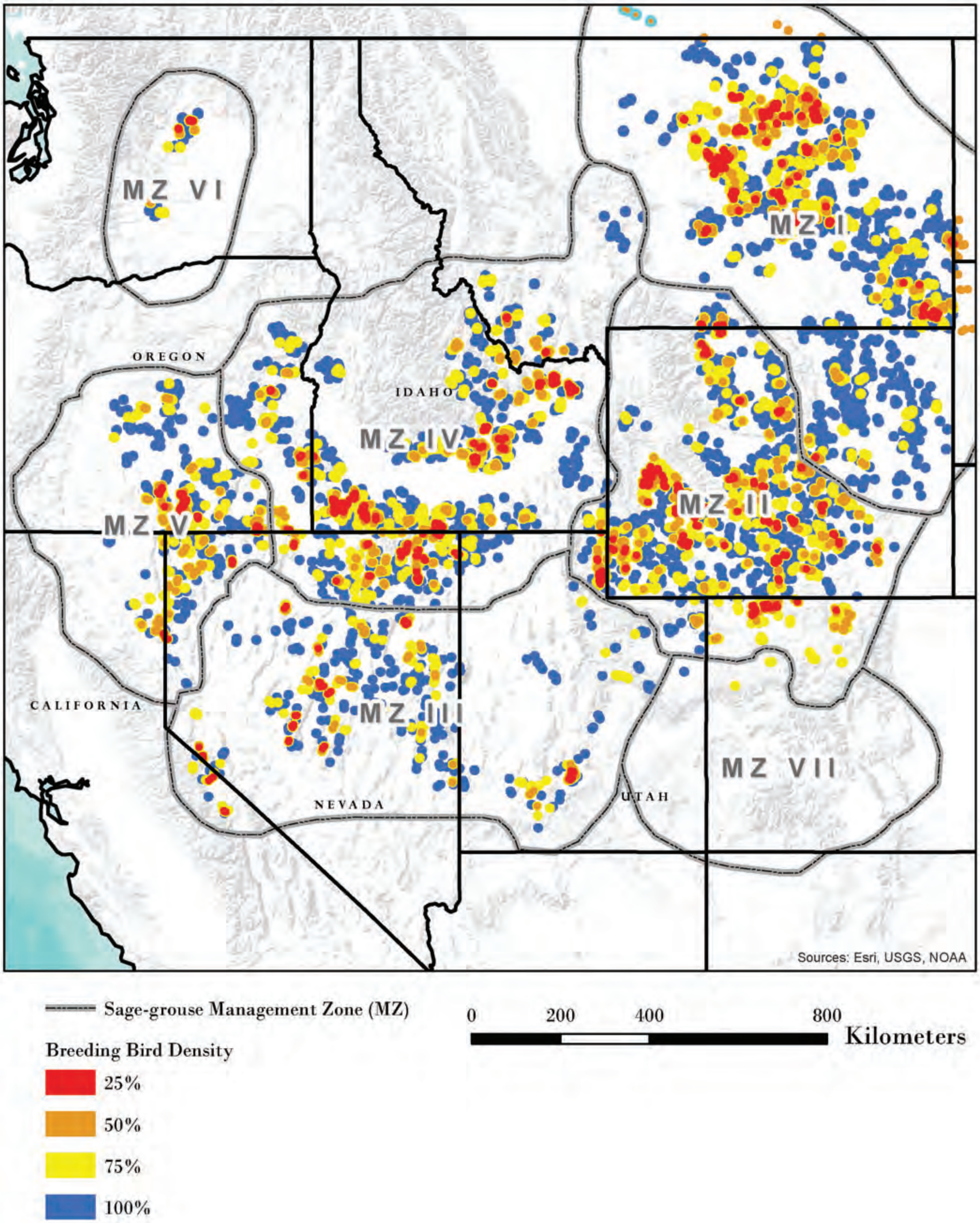


Figure 15. Range-wide sage-grouse breeding bird densities from Doherty et al. 2010. Points illustrate breeding bird density areas that contain 25, 50, 75, and 100% of the known breeding population and are based on maximum counts of males on leks (n = 4,885). Leks were mapped according to abundance values and buffered by 6.4 to 8.5 km (4.0 to 5.2 mi) to delineate nesting areas.

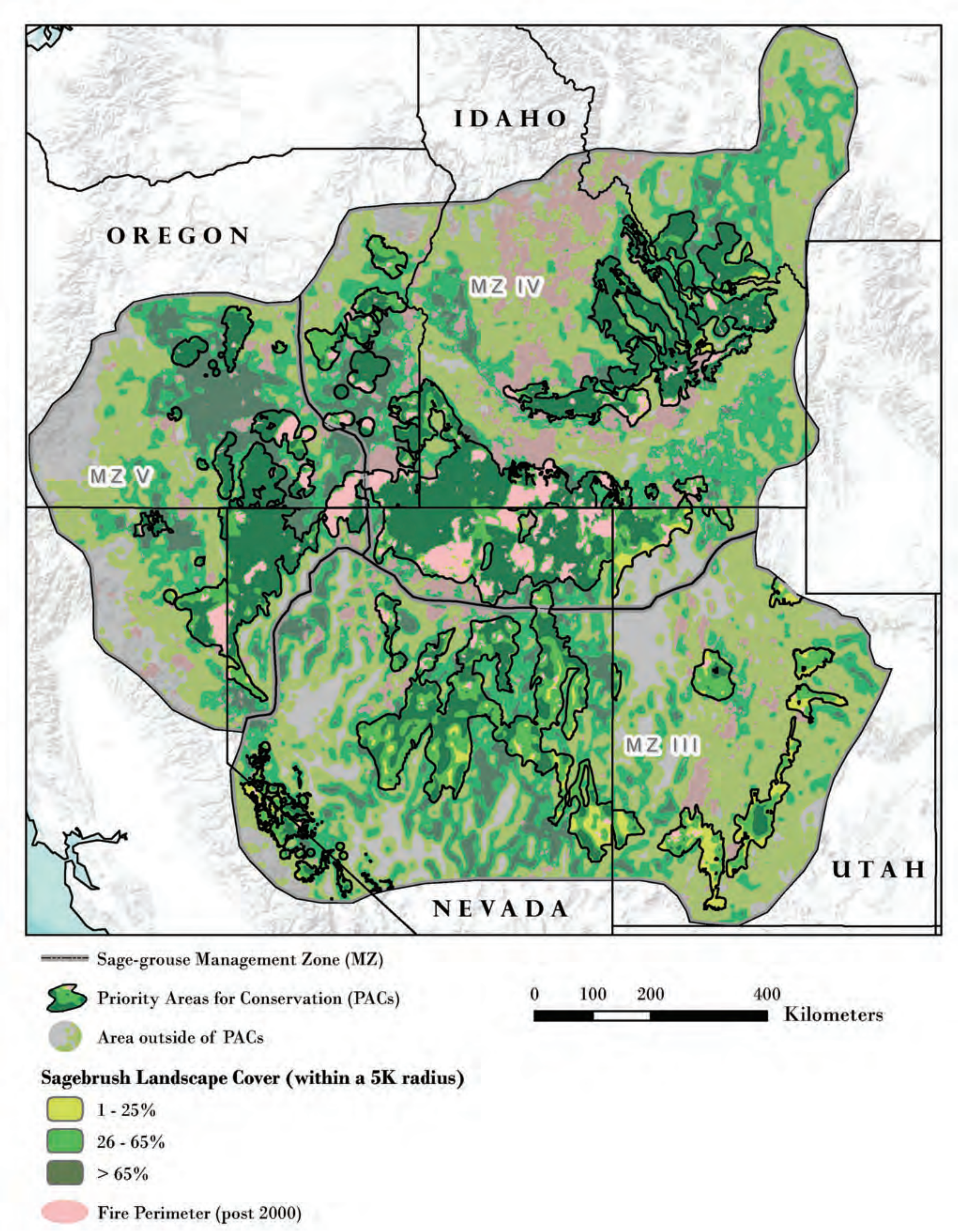


Figure 16. The landscape cover of sagebrush within each of three selected categories (1-25%, 26-65%, >65%) for Management Zones III, IV, and V (Stiver et al. 2006). The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover. Darker colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

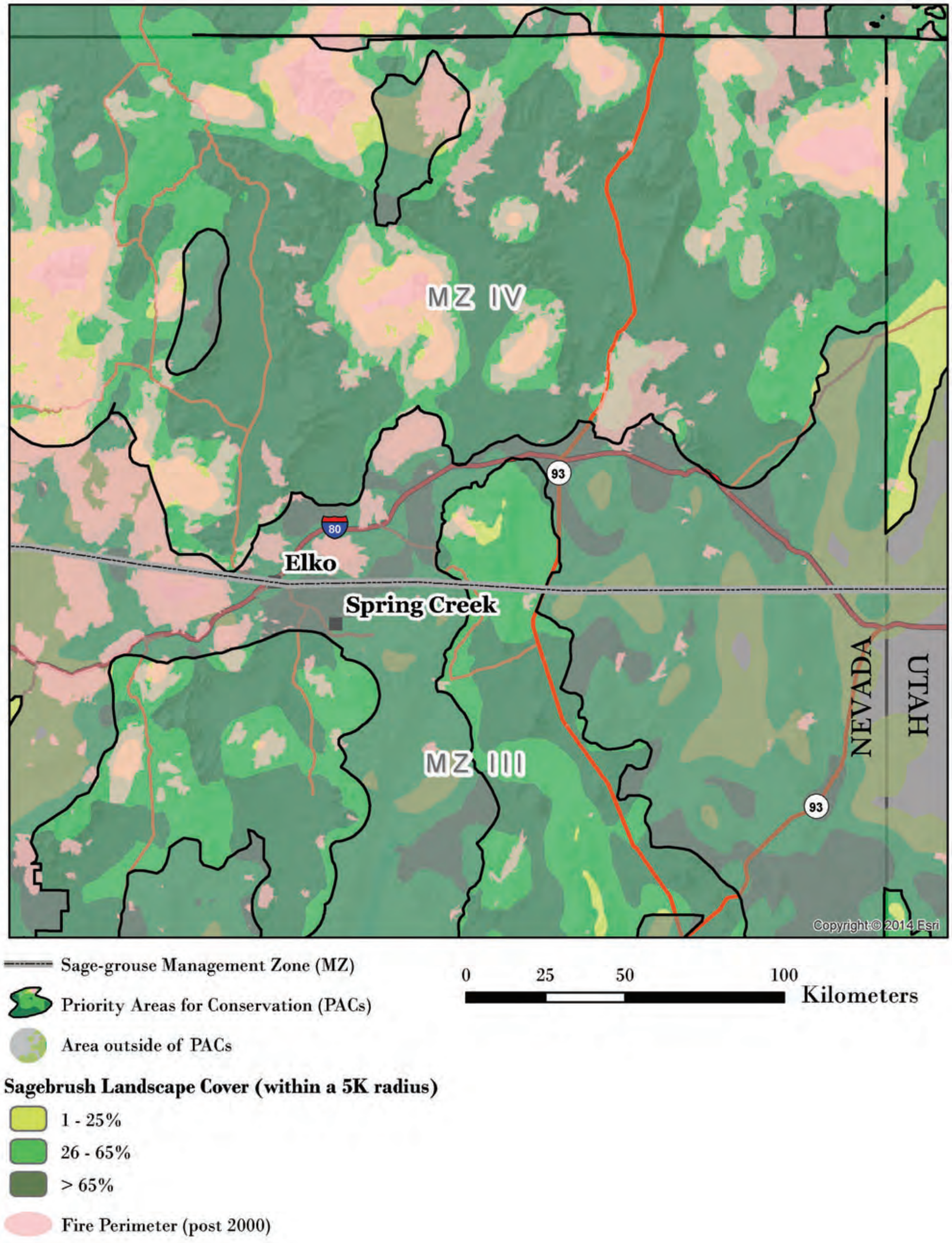


Figure 17. The landscape cover of sagebrush within each of the selected categories (1-25%, 26-65%, >65%) for the north-eastern portion of Nevada. The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover. Darker colored polygons delineate Priority Areas for Conservation (USFWS 2013).

Resilience to disturbance and resistance to annuals: Soil temperature and moisture regimes are a strong indicator of ecological types and of resilience to disturbance and resistance to invasive annual plants (fig. 11; table 1). Resilience and resistance predictions coupled with landscape cover of sagebrush can provide critical information for determining focal areas for targeted management actions (tables 2, 3, and 4). The available data for the soil temperature and moisture regimes were recently compiled to predict resilience and resistance (see Appendix 3). These data, displayed for the western portion of the range and northeast Nevada (figs. 18 and 19), illustrate the spatial variability within the focal areas. Soil temperature and moisture regimes are two of the primary determinants of ecological types and of more detailed ecological site descriptions, which are described in the section on "Determining the Most Appropriate Management Treatments at the Project Scale."

Habitat threats: Examining additional land cover data or models of invasive annual grasses and piñon and/or juniper, can provide insights into the current extent of threats in a planning area (e.g., Manier et al. 2013). In addition, evaluating data on fire occurrence and size can provide information on fire history and the rate and pattern of change within the planning area. Data layers for cheatgrass cover have been derived from Landsat imagery (Peterson 2006, 2007) and from model predictions based on species occurrence, climate variables, and anthropogenic disturbance (e.g., the Bureau of Land Management [BLM] Rapid Ecoregional Assessments [REAs]). The REAs contain a large amount of geospatial data that may be useful in providing landscape scale information on invasive species, disturbances, and vegetation types across most of the range of sage-grouse (http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas.html). Similarly, geospatial data for piñon and/or juniper have been developed for various States (e.g., Nevada and Oregon) and are becoming increasingly available rangewide. In addition, more refined data products are often available at local scales. Land managers can evaluate the available land cover datasets and select those land covers with the highest resolution and accuracy for the focal area. Land cover of cheatgrass and piñon and/or juniper and the fire history of the western portion of the range and northeast Nevada are in figures 20-25.

Assessing Focal Areas for Sage-Grouse Habitat Management: Integrating Data Layers

Combining resilience and resistance concepts with sage-grouse habitat and population data can help land managers further gauge relative risks across large landscapes and determine where to focus limited resources to conserve sage-grouse populations. Intersecting breeding bird density areas with soil temperature and moisture regimes provides a spatial tool to depict landscapes with high bird concentrations that may have a higher relative risk of being negatively affected by fire and annual grasses (figs. 26, 27). For prioritization purposes, areas supporting 75% of birds (6.4 to 8.5 km [4.0 to 5.2 mi] buffer around leks) can be categorized as high density while remaining breeding bird density areas (75-100% category; 8.5-km [5.2-mi] buffer around leks) can be categorized as low density. Similarly, warm and dry types can be categorized as having relatively low resilience to fire and resistance to invasive species and all other soil temperature and moisture regimes can be categorized as having relatively moderate to high resilience and resistance. Intersecting breeding bird density areas with landscape cover of sagebrush provides another spatial component revealing large and intact habitat blocks and areas in need of potential restoration to provide continued connectivity (fig. 28).

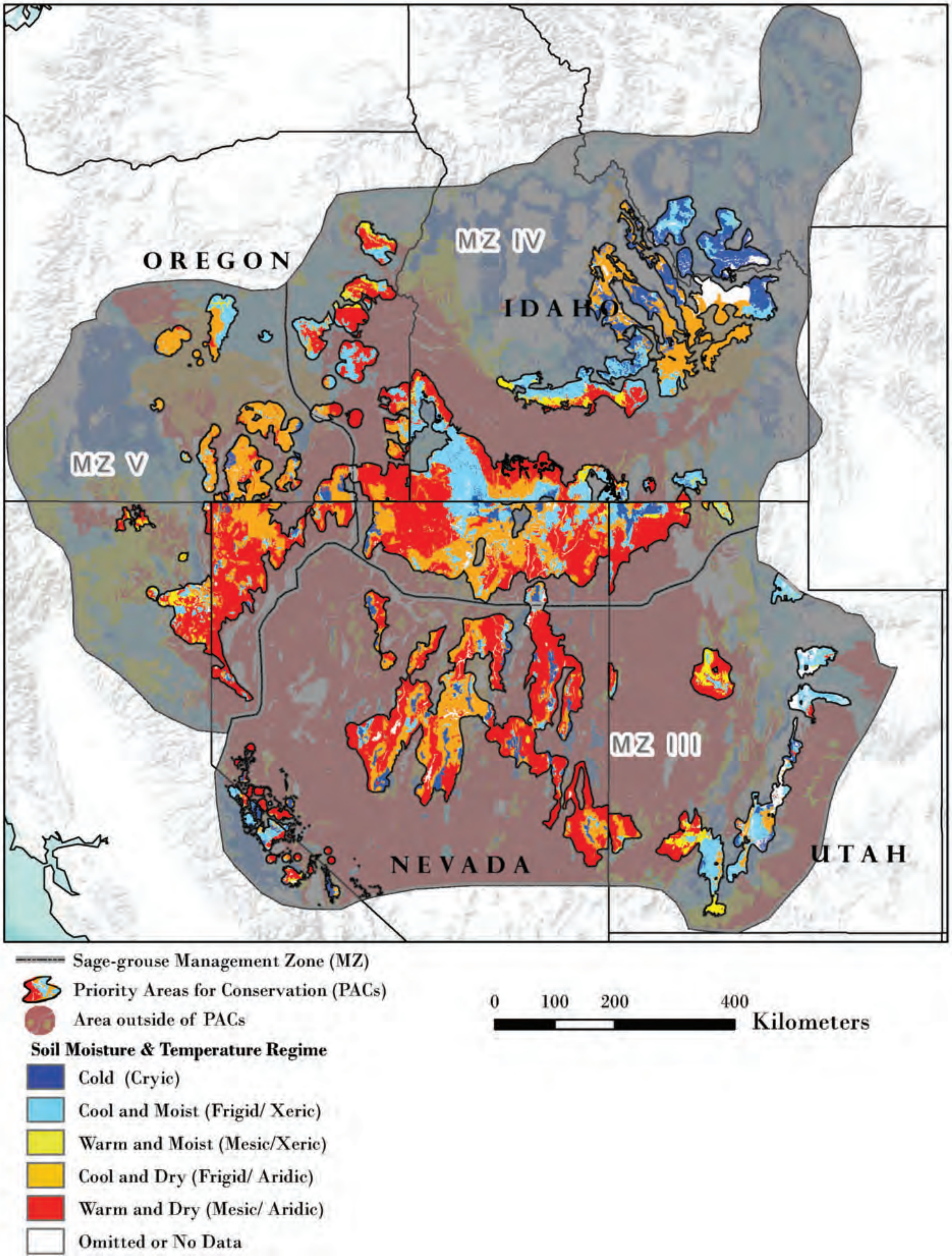


Figure 18. The soil temperature and moisture regimes within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b). Darker colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

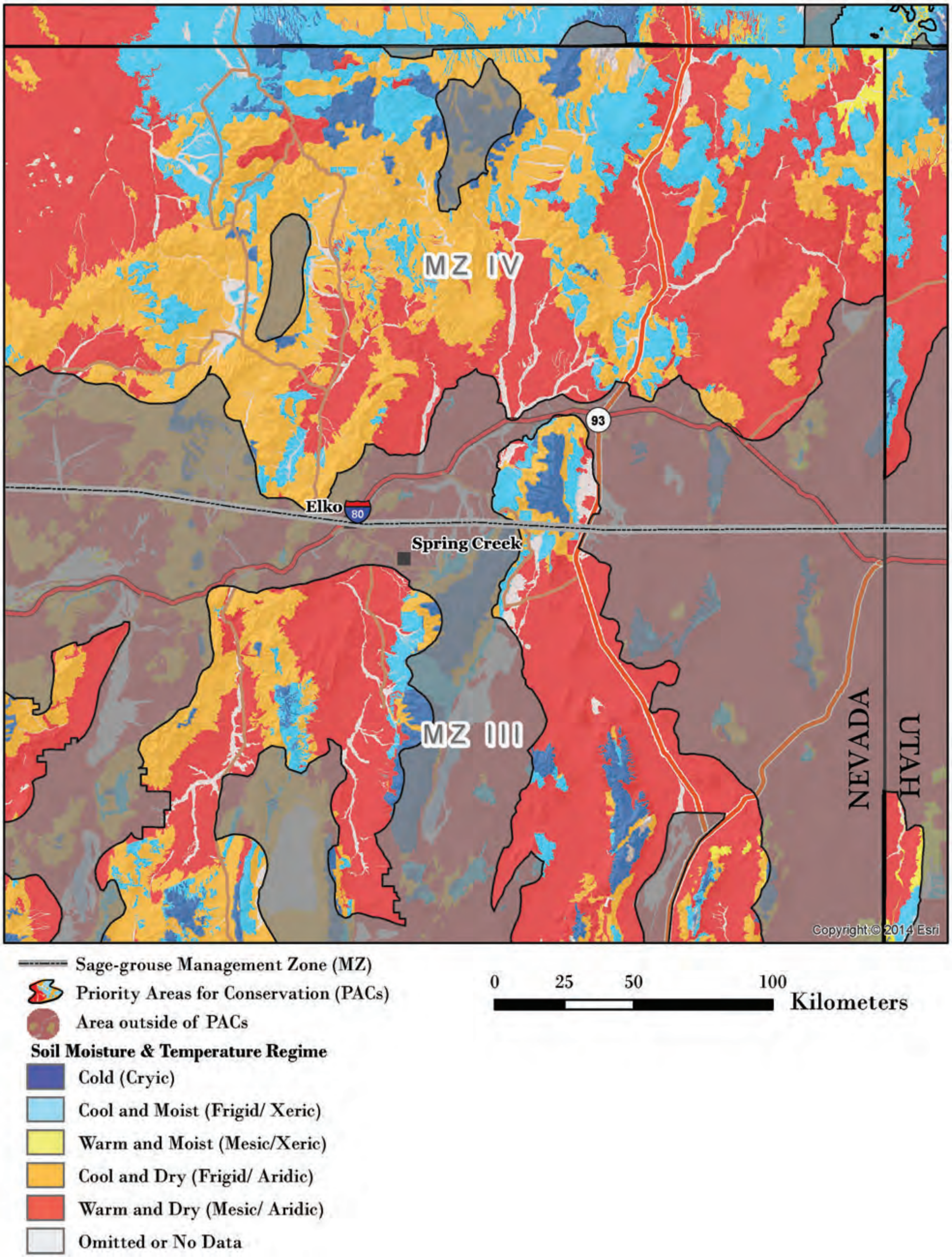


Figure 19. The soil temperature and moisture regimes for the northeast corner of Nevada. Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b). Darker colored polygons delineate Priority Areas for Conservation (USFWS 2013).

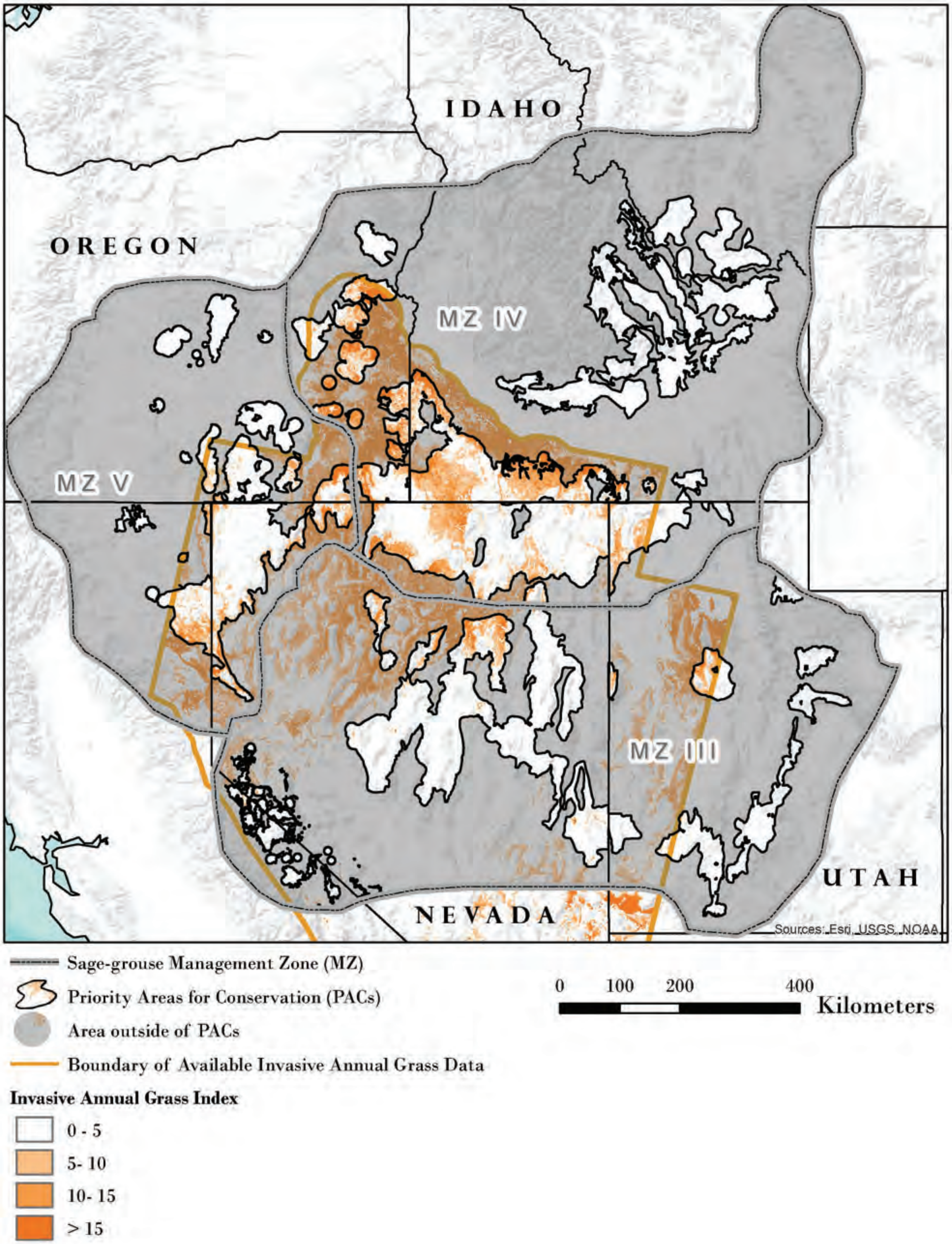


Figure 20. Invasive annual grass index for Nevada (Peterson 2006) and the Owhyee uplands (Peterson 2007) displayed for sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

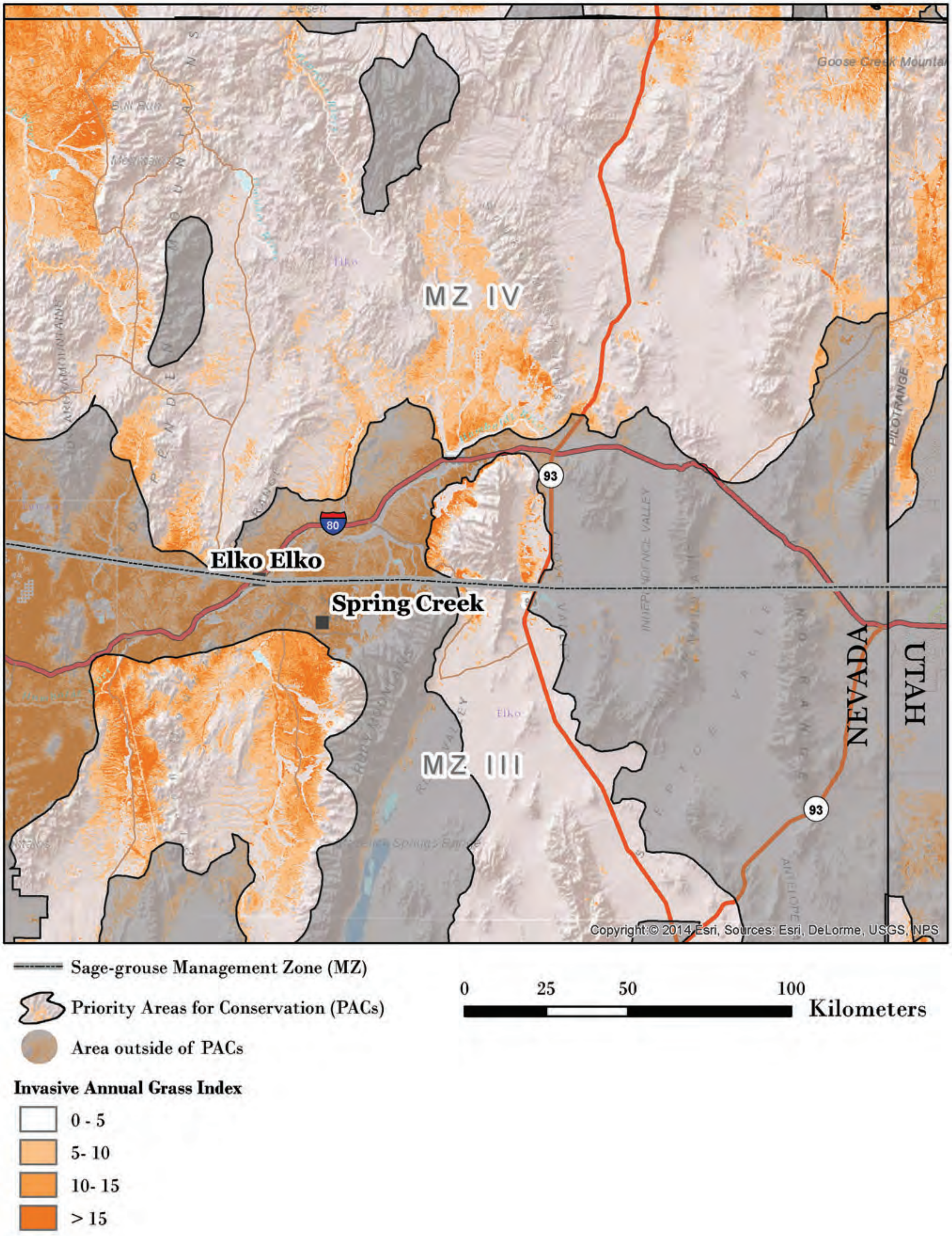


Figure 21. Invasive annual grass index for Nevada (Peterson 2006) and the Owhyee uplands (Peterson 2007) displayed for the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

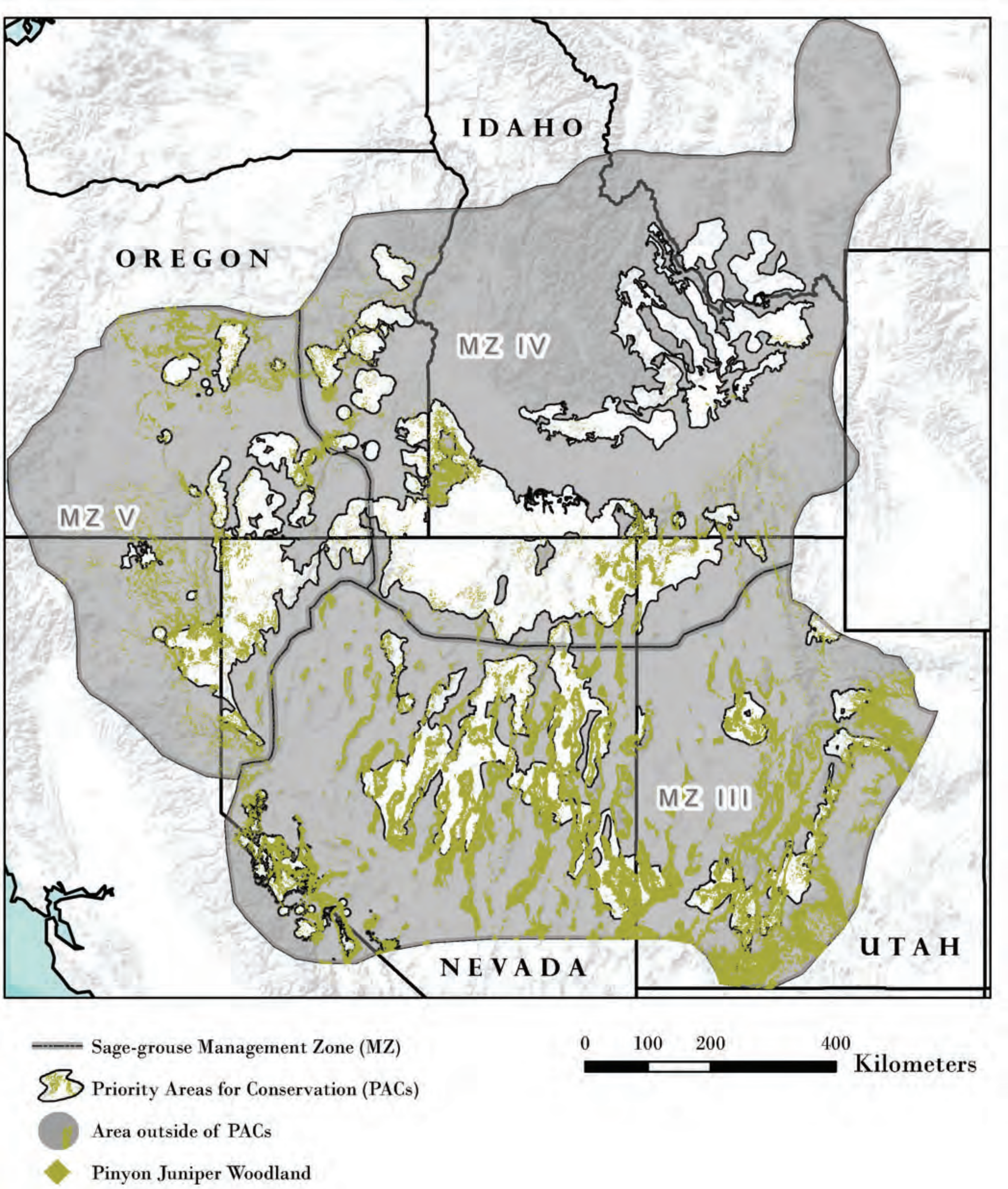


Figure 22. Piñon and/or juniper woodlands (USGS 2004; USGS 2013) within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

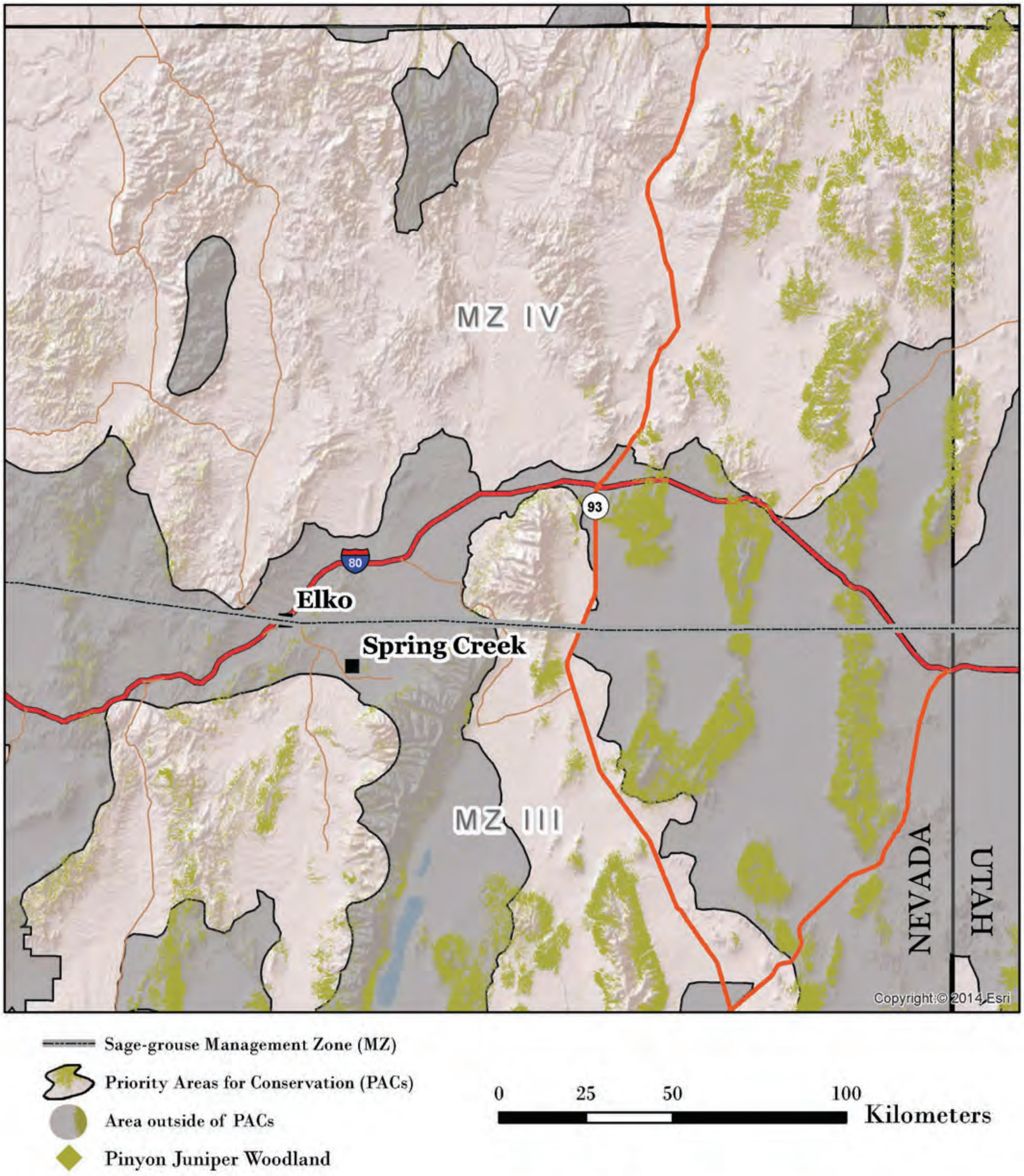


Figure 23. Piñon and/or juniper woodlands (USGS 2004; USGS 2013) within the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

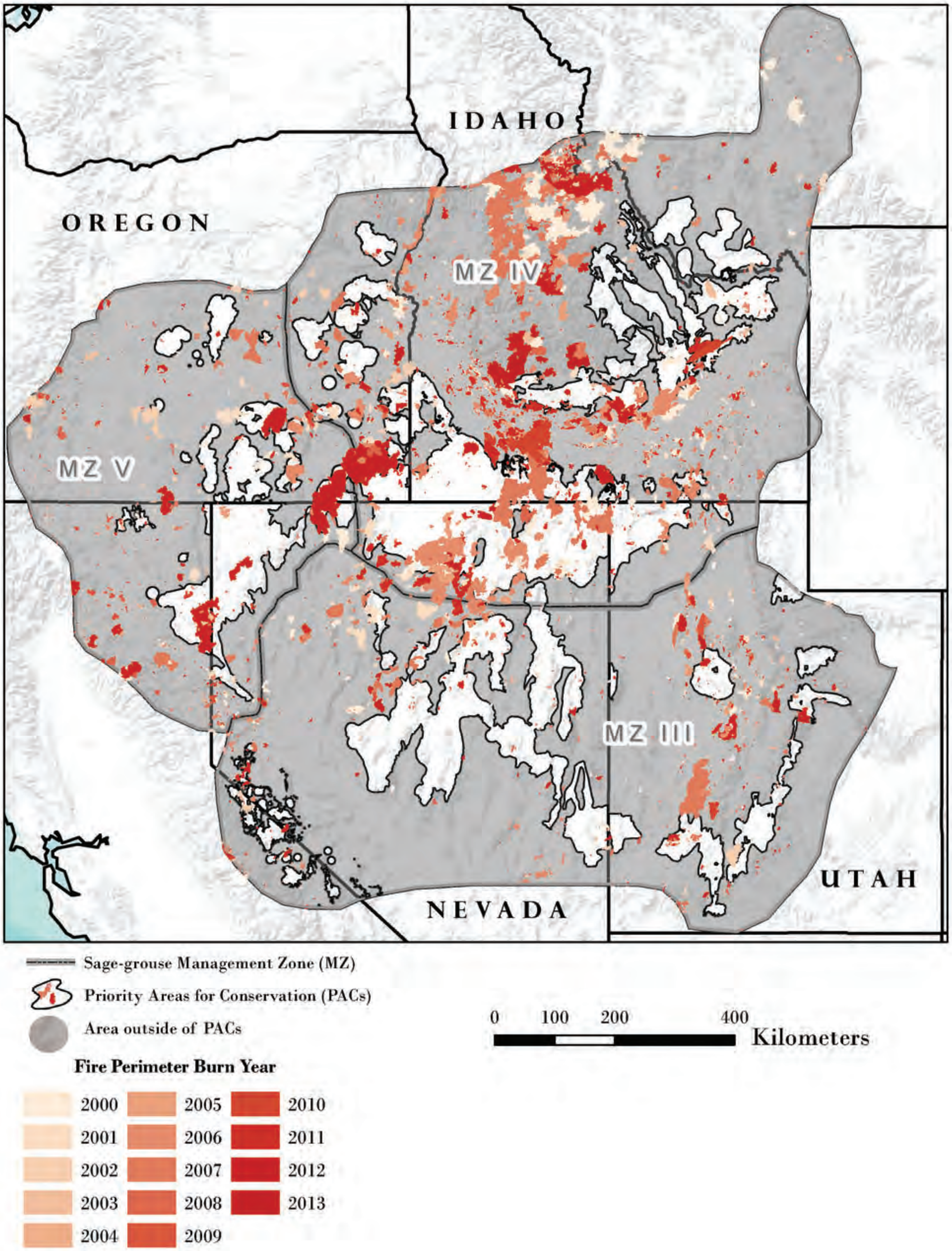


Figure 24. Fire perimeters (Walters et al. 2011; Butler and Bailey 2013) within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Ligher colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

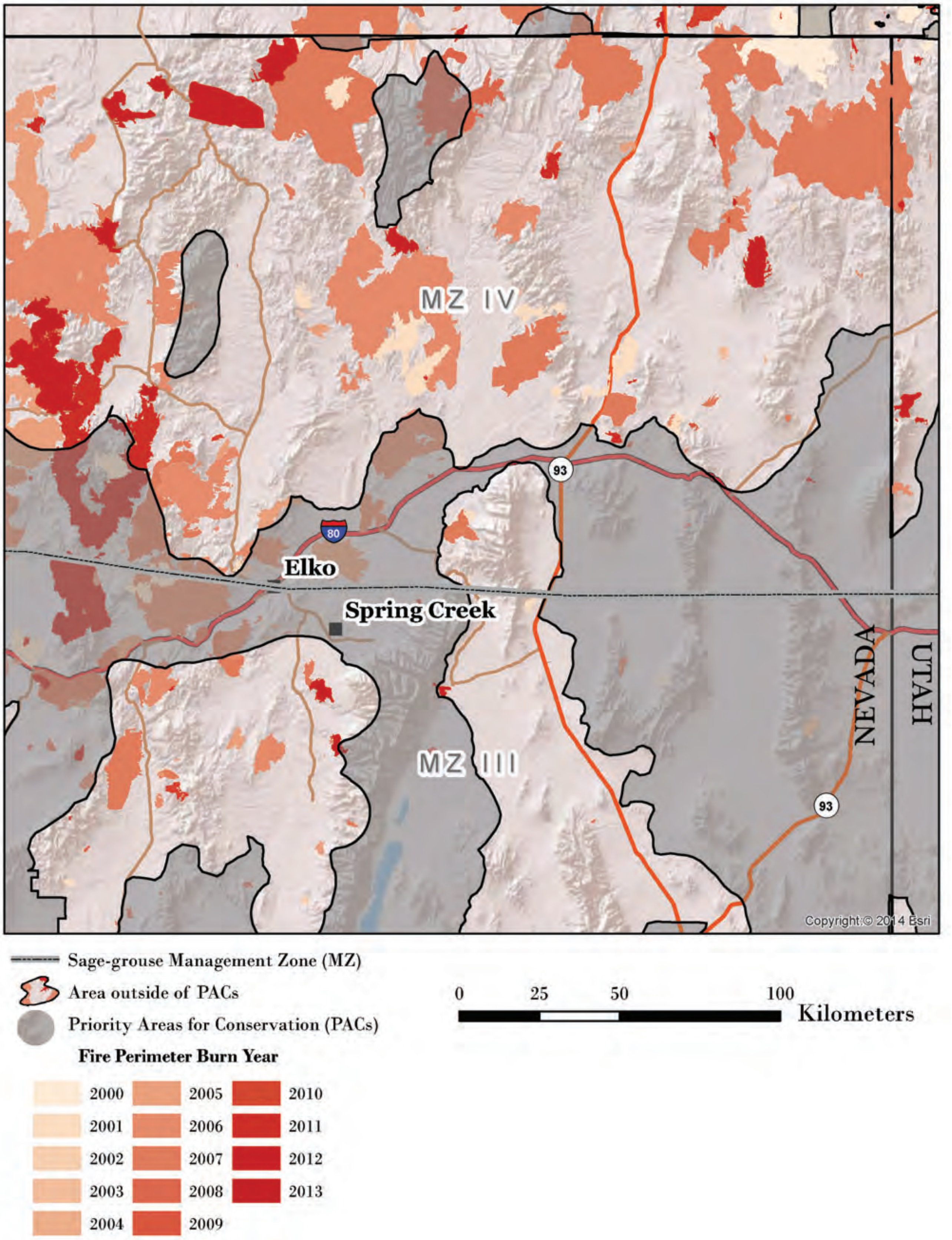


Figure 25. Fire perimeters (Walters et al. 2011; Butler and Bailey 2013) within the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

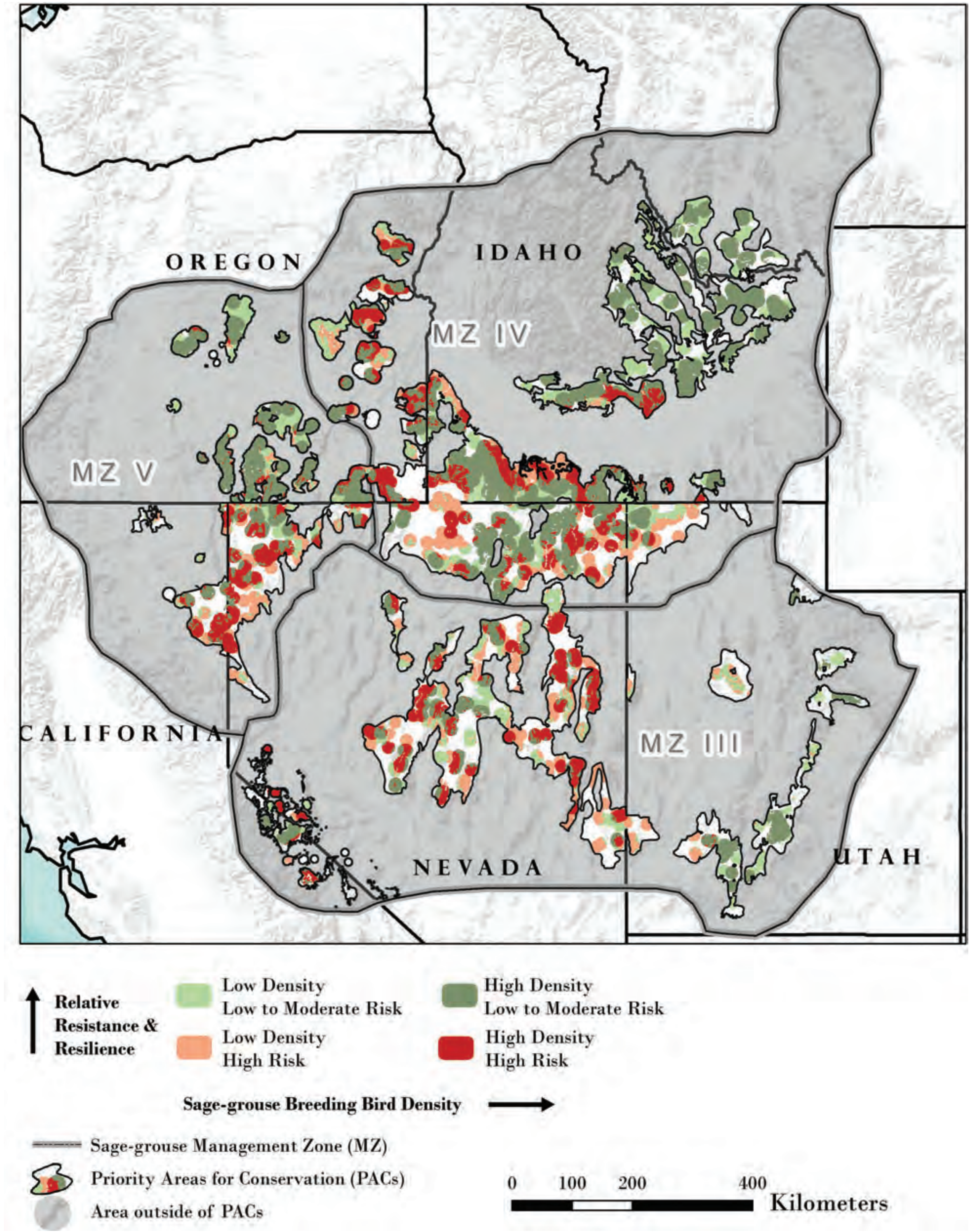


Figure 26. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to resilience and resistance within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Relative resilience and resistance groups are derived from soil moisture and temperature classes (Soil Survey Staff 2014a, b) as described in text, and indicate risk of invasive annual grasses and wildfire. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

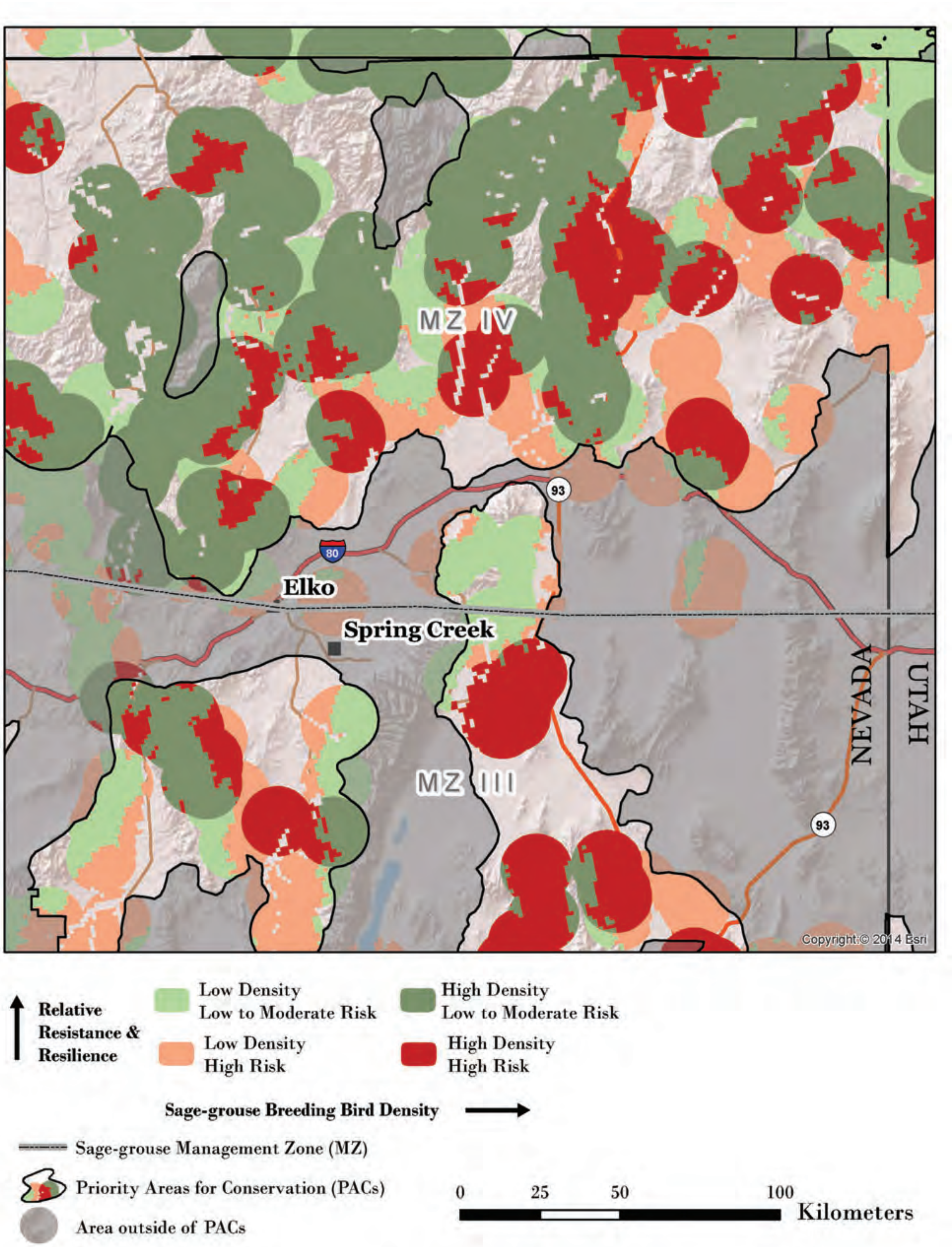


Figure 27. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to resilience and resistance in the northeast corner of Nevada. Relative resilience and resistance groups are derived from soil moisture and temperature classes (Soil Survey Staff 2014a, b) as described in text, and indicate risk of invasive annual grasses and wildfire. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

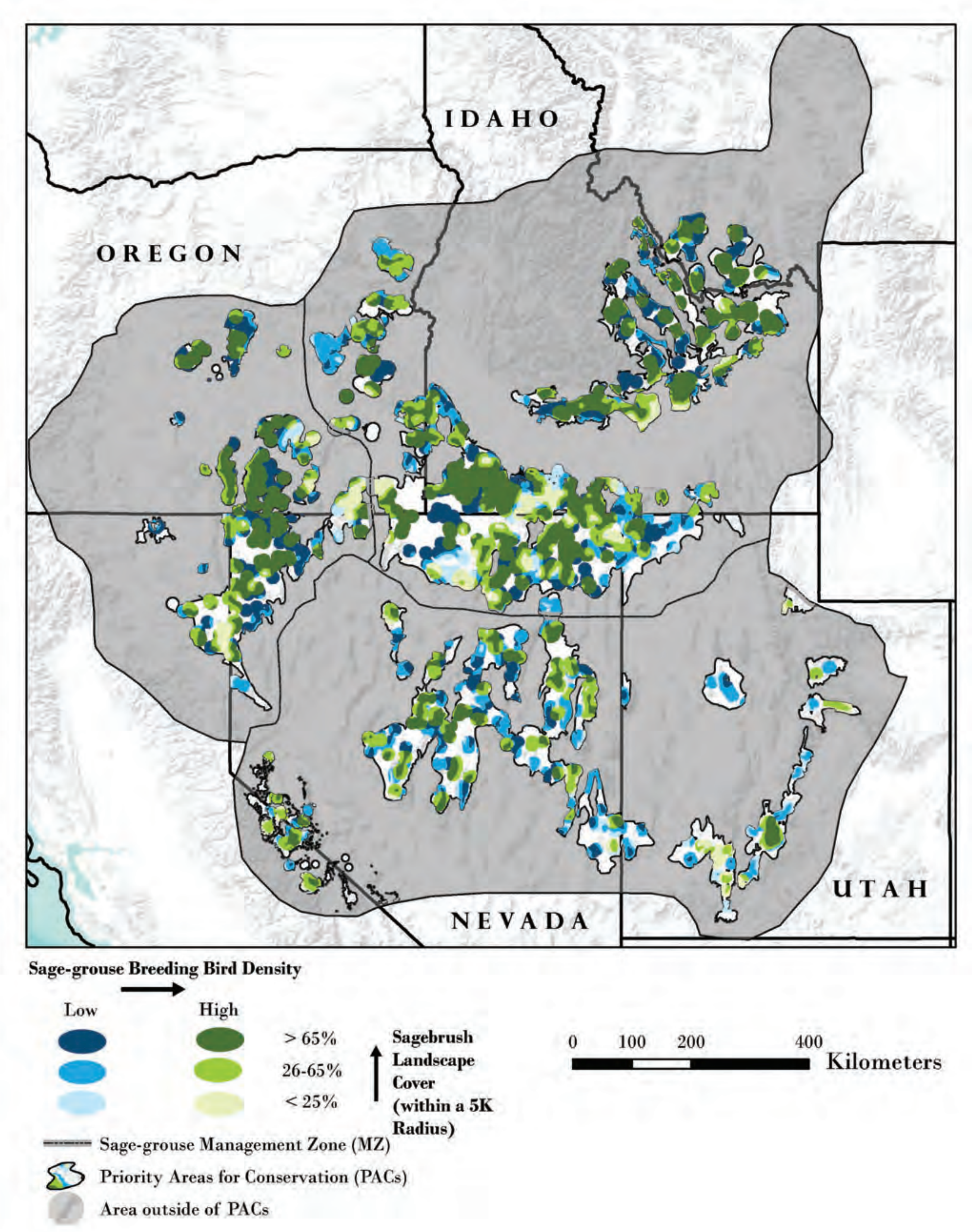


Figure 28. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to sagebrush cover. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Resilience and resistance and sagebrush cover combined with bird population density data provide land managers a way to evaluate trade-offs of particular management options at the landscape scale. For example, high density, low resilience and resistance landscapes with >65% sagebrush landscape cover may require immediate attention for conservation efforts because they currently support a high concentration of birds but have the lowest potential to recover to desired conditions post-fire and to resist invasive plants when disturbed. Similarly, high density but moderate-to-high resilience and resistance landscapes with 26-65% sagebrush cover may be priorities for preventative actions like conifer removal designed to increase the proportion of sagebrush cover and maintain ecosystem resilience and resistance. Mapping relative resilience and resistance and landscape cover of sagebrush for sage-grouse breeding areas should be viewed as a component of the assessment process that can help local managers allocate resources to accelerate planning and implementation.

Interpretations at the Management Zone (MZ) Scale: Western Portion of the Range

An examination of land cover and additional data layers for the western portion of the range reveals large differences among Management Zones (MZs) III, IV and V. MZs IV and V have larger areas with sagebrush cover >65% than MZ III (fig. 16). This may be partly explained by basin and range topography in MZ III, which is characterized by large differences in both environmental conditions and ecological types over relatively short distances. However, the cover of piñon and juniper in and adjacent to PACs in MZ III also is higher than in either MZ IV or V (fig. 22). The greater cover of piñon and juniper in MZ III appears to largely explain the smaller patches of sagebrush cover in the 26-65% and >65% categories.

Our capacity to quantify understory vegetation cover using remotely sensed data is currently limiting, but a visual examination of estimates for invasive annual grass (fig. 20; Peterson 2006, 2007) suggests a higher index (greater cover) in areas with relatively low resistance (warm soil temperatures) in all MZs (see fig. 18). This is consistent with current understanding of resistance to cheatgrass (Chambers et al. 2014; Chambers et al. *in press*). It is noteworthy that the invasive annual grass index is low for most of the central basin and range (central Nevada). Several factors may be contributing to the low index for this area including climate, the stage of piñon and juniper expansion and linked decrease in fire frequency, the relative lack of human development, and the relative lack of management treatments in recent decades (Wisdom et al. 2005; Miller et al. 2011). Not surprisingly, areas with a high annual grass index are outside or on the periphery of current PACs. However, it is likely that invasive annual grasses are present on many warmer sites and that they may increase following fire or other disturbances. In areas with low resistance to invasive annual grasses, they often exist in the understory of sagebrush ecosystems and are not detected by remote sensing platforms such as Landsat.

The number of hectares burned has been highest in MZ IV, adjacent areas in MZ V, and in areas with relatively low resilience and resistance in the northern portion of MZ III that have a high invasive annual grass index (figs. 18, 20, 24). A total of over 1.1 million hectares (2.7 million acres) burned in 2000 and 2006, while over 1.7 million hectares (4.2 million acres) burned in 2007 and 2012 and almost three quarters of these acres were in MZ IV (table 5). In some cases, these fires appear to be linked to the annual invasive grass index, but in others it clearly is not. At this point, there appears to be little relationship between cover of piñon and juniper and wildfire. Mega-fires comprised of hundreds of thousands of acres have burned in recent years, especially in MZ IV. These fires have occurred primarily in areas with low to moderate resilience and resistance and during periods with extreme burning conditions.

Table 5. The number of hectares (acres) burned in Management Zones III, IV, and V each year from 2000 to 2013.

Year	Management Zone III		Management Zone IV		Management Zone V		Total	
2000	155,159	(383,405)	868,118	(2,145,165)	88,871	(219,606)	1,112,148	(2,748,176)
2001	164,436	(406,330)	272,870	(674,276)	141,454	(349,541)	578,760	(1,430,147)
2002	85,969	(212,433)	100,308	(247,867)	113,555	(280,601)	299,833	(740,902)
2003	21,869	(54,038)	127,028	(313,892)	27,597	(68,192)	176,493	(436,123)
2004	20,477	(50,600)	11,344	(28,032)	13,037	(32,216)	44,858	(110,847)
2005	45,130	(111,520)	374,894	(926,382)	22,039	(54,458)	442,063	(1,092,360)
2006	198,762	(491,150)	860,368	(2,126,014)	117,452	(290,230)	1,176,582	(2,907,394)
2007	371,154	(917,140)	1,240,303	(3,064,853)	134,520	(332,406)	1,745,977	(4,314,399)
2008	14,015	(34,632)	109,151	(269,717)	43,949	(108,599)	167,115	(412,949)
2009	43,399	(107,242)	12,250	(30,271)	47,918	(118,408)	103,568	(255,921)
2010	31,597	(78,078)	280,662	(693,531)	21,940	(54,216)	334,200	(825,825)
2011	83,411	(206,114)	283,675	(700,977)	22,909	(56,608)	389,995	(963,699)
2012	203,680	(503,303)	946,514	(2,338,885)	574,308	(1,419,144)	1,724,501	(4,261,331)
2013	45,976	(113,610)	368,434	(910,419)	15,852	(39,170)	430,262	(1,063,199)
Total	1,485,034	(3,669,595)	5,855,920	(14,470,281)	1,385,400	(3,423,396)	8,726,354	(21,563,271)

Coupling breeding bird densities with landscape cover of sagebrush indicates that populations with low densities tend to occur in areas where sagebrush cover is in the 26-65% category, and few populations occur in areas with <25% sagebrush cover (fig. 27) (Knick et al. 2013). Combining the breeding bird densities with resilience and resistance indicates significant variability in risks among high density populations within PACs (fig. 26). A large proportion of remaining high density centers within PACs occurs on moderate-to-high resilience and resistance habitats, while low density/low resilience and resistance areas tend to occur along the periphery of PACs or are disproportionately located in MZ III and southern parts of MZ V.

Examination of other data layers suggests that different wildfire and invasive species threats exist across the western portion of the range, and that management should target the primary threats to sage-grouse habitat within focal areas. In MZs IV and V invasive annual grasses—especially on the periphery of the PACs—and wildfire are key threats. However, recent wildfires are not necessarily linked to invasive annual grasses. This suggests that management strategies for these MZs emphasize fire operations, fuels management focused on decreasing fire spread, and integrated strategies to control annual grasses and increase post-fire rehabilitation and restoration success. Differences in piñon and/or juniper landscape cover exist among MZs with 5,131,900 ha (12,681,202 ac) in MZ III, 528,377ha (1,305,649 ac) in MZ IV, and 558,880 ha (1,381,024 ac) in MZ V. Portions of MZs IV and V are still largely in early stages of juniper expansion indicating a need to address this threat before woodland succession progresses. Because of generally low resilience and resistance in MZ III, greater emphasis is needed on habitat conservation, specifically minimizing or eliminating stressors. Also, greater emphasis on reducing cover of piñon and juniper is needed to reduce woody fuels and increase sagebrush ecosystem resilience to fire by increasing the recovery potential of native understory species.

Interpretations at Regional and Local Land Management Scales: Northeast Nevada Example

The same land covers and data layers used to assess focal areas for sage-grouse habitat within MZs in the western portion of the species range can be used to evaluate focal areas for management in regional planning areas and land management planning units. The emphasis at the scale of the land planning area or management planning unit is on maintaining or increasing large contiguous areas of sagebrush habitat with covers in the 26-65% and especially >65% category. Resilience to disturbance and resistance to invasive annual grasses as indicated by soil temperature and moisture regimes is used to determine the most appropriate activities within the different cover categories. The sage-grouse habitat matrix in table 2 describes the capacity of areas with differing resilience and resistance to recover following disturbance and resist annual invasive grasses and provides the management implications for each of the different cover categories. Table 4 provides potential management strategies for the different sagebrush cover and resilience and resistance categories (cells) in the sage-grouse habitat matrix by agency program areas (fire operations, fuels management, post-fire rehabilitation, habitat restoration). Note that the guidelines in table 4 are related to the sage-grouse habitat matrix, and do not preclude other factors from consideration when determining management priorities for program areas.

Here, we provide an example of how to apply the concepts and tools discussed in this report by examining an important region identified in the MZ scale assessment. The northeastern corner of Nevada was selected to illustrate the diversity of sage-grouse habitat within planning areas and the need for proactive collaboration both within agencies and across jurisdictional boundaries in devising appropriate management strategies (figs. 17, 19, 21, 23, 25). This part of Nevada has large areas of invasive annual grasses and areas with piñon and juniper expansion, and it has experienced multiple large fires in the last decade. It includes a BLM Field Office, Forest Service (FS) land, State land, multiple private owners, and borders two States (fig. 29), which results in both complex ownership and natural complexity.

In the northeast corner of Nevada, an area 5,403,877 ha (13,353,271 ac) in size, numerous large fires have burned in and around PACs (fig. 25). Since 2000, a total of 1,144,317 ha (2,827,669 ac) have burned with the largest fires occurring in 2000, 2006, and 2007. This suggests that the primary management emphasis be on retaining existing areas of sagebrush in the 26-65% and especially >65% categories and promoting recovery of former sagebrush areas that have burned. Fire suppression in and around large, contiguous areas of sagebrush and also in and around successful habitat restoration or post-fire rehabilitation treatments is a first order priority. Fuels management also is a high priority and is focused on strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire without jeopardizing existing habitat quality. Also, in the eastern portion of the area, piñon and juniper land cover comprises 471,645 ha (1,165,459 ac) (fig. 23). In this area, management priorities include (1) targeted tree removal in early to mid-phase (Phase I and II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads, and (2) targeted tree removal in later phase (Phase III) post-settlement piñon and juniper areas to reduce risk of high severity fire. In areas with moderate to high resilience and resistance, post-fire rehabilitation focuses on accelerating sagebrush establishment and recovery of perennial native herbaceous species. These areas often are capable of unassisted recovery and seeding is likely needed only in areas where perennial native herbaceous species have been depleted (Miller et al. 2013). Seeding introduced species can retard recovery of native perennial grasses and forbs that are important to sage-grouse and should be avoided in these areas (Knutson et al. 2014). Seeding or transplanting of sagebrush may be needed to accelerate establishment in focal areas.

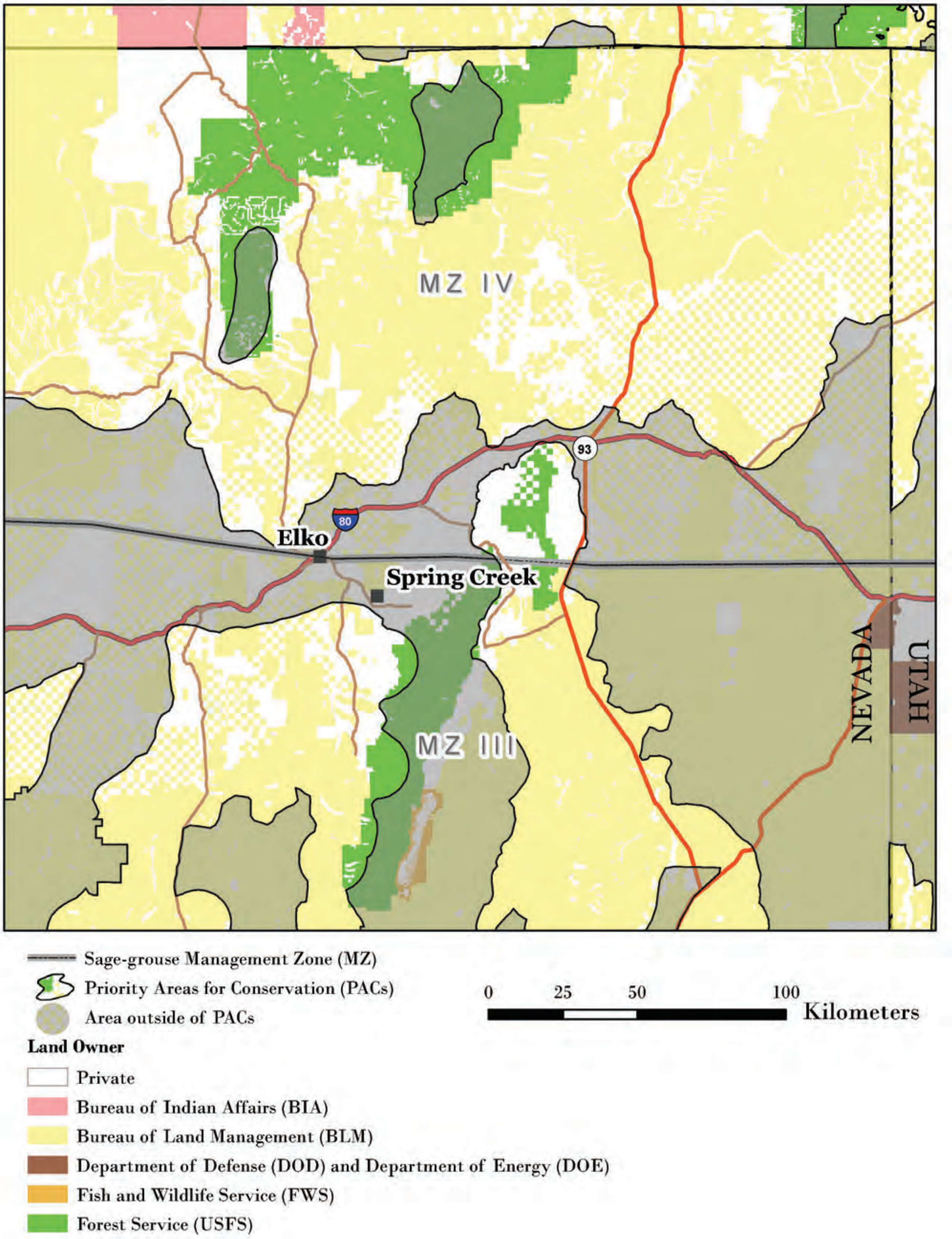


Figure 29. Land ownership for the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

In areas with lower resilience and resistance and high breeding bird densities, large, contiguous areas of sagebrush with intact understories are a high priority for conservation (figs. 17, 19, 27). In these areas, emphasis is on maintaining or increasing habitat conditions by minimizing stressors and disturbance. Post-fire rehabilitation and restoration activities focus on areas that increase connectivity among existing large areas of sagebrush. Because of low and variable precipitation, more than one intervention may be required to achieve restoration or rehabilitation goals. Appropriately managing livestock, wild horse and burro use (if applicable), and recreational use in focal areas is especially important to promote native perennial grass and forb growth and reproduction and to maintain or enhance resilience and resistance.

Determining the Most Appropriate Management Treatments at the Project Scale

Once focal areas and management priorities have been determined, potential treatment areas can be assessed to determine treatment feasibility and appropriate treatment methods. Different treatment options exist (figs. 30, 31) that differ in both suitability for a focal area and likely effectiveness. Field guides for sagebrush ecosystems and piñon and juniper expansion areas that incorporate resilience and resistance concepts are being developed to help guide managers through the process of determining both the suitability of an area for treatment and the most appropriate treatment. These guides are aligned with the different program areas and emphasize (1) fuel treatments (Miller et al. 2014a), (2) post-fire rehabilitation (Miller et al. 2014b), and (3) restoration (Pyke et al., in preparation). Additional information on implementing these types of management treatments is synthesized in Monsen et al. (2004) and Pyke (2011); additional information on treatment response is synthesized in Miller et al. (2013). In this section, we summarize the major steps in the process for determining the suitability of an area for treatment and the most appropriate treatment. We then provide an overview of two of the primary tools in the assessment process – ecological site descriptions (ESDs) and state and transition models (STMs). We conclude with a discussion of the importance of monitoring and adaptive management.

Steps in the process*:* Logical steps in the process of determining the suitability of an area for treatment and the most appropriate treatment(s) include (1) assessing the potential treatment area and identifying ecological sites, (2) determining the current successional state of the site, (3) selecting the appropriate action(s), and (4) monitoring and evaluation to determine post-treatment management. A general approach that uses questions to identify the information required in each step was developed (table 6). These questions can be modified to include the specific information needed for each program area and for treating different ecological sites. This format is used in the field guides described above.

Figure 30. Common vegetation treatments for sagebrush dominated ecosystems with relatively low resilience and resistance include seeding after wildfire in areas that lack sufficient native perennial grasses and forbs for recovery (top) (photo by Chad Boyd), and mowing sagebrush to reinvigorate native perennial grasses and forbs in the understory (bottom) (photo by Scott Schaff). Success of mowing treatments depends on having adequate perennial grasses and forbs on the site to resist invasive annual grasses and to promote recovery.

Figure 31. Vegetation treatments for sagebrush ecosystems exhibiting piñon and juniper expansion include cutting the trees with chainsaws and leaving them in place (top) (photo by Jeremy Roberts) and shredding them with a “bullhog” (middle) (photo by Bruce A. Roundy) on sites with relatively warm soils and moderately low resistance to cheatgrass. Prescribed fire (bottom) (photo by Jeanne C. Chambers) can be a viable treatment on sites with relatively cool and moist soils that have higher resilience to disturbance and resistance to invasive annual grasses. Treatment success depends on having adequate perennial grasses and forbs on the site to resist invasive annual grasses and promote recovery and will be highest on sites with relatively low densities of trees (Phase I to Phase II woodlands).

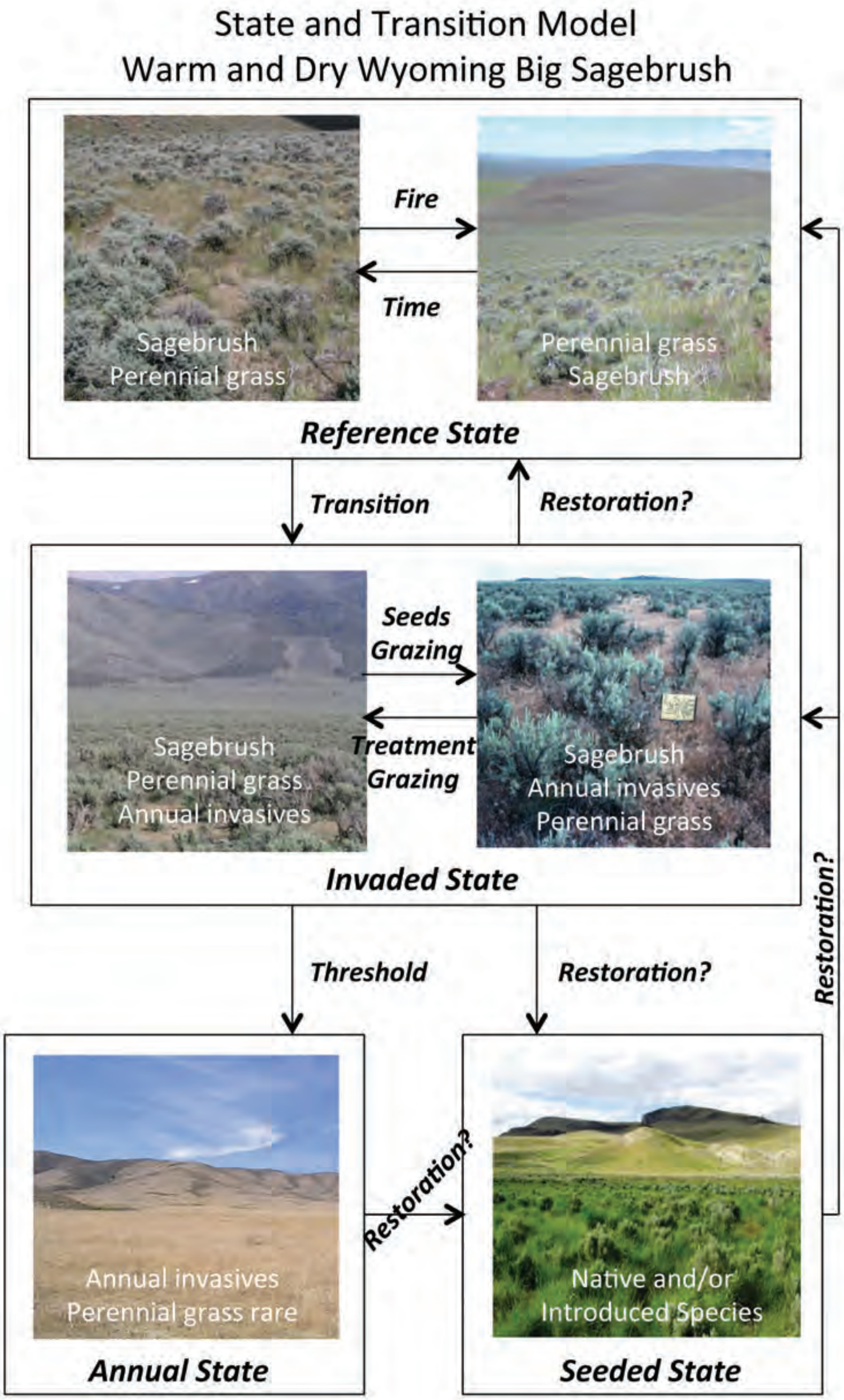
Table 6. General guidelines for conducting fuels management, fire rehabilitation, and restoration treatments (modified from Miller et al. 2007; Tausch et al. 2009; Pyke 2011; Chambers et al. 2013).

Steps in the process	Questions and considerations
I. Assess potential treatment area and identify ecological sites	1. Where are priority areas for fuels management, fire rehabilitation or restoration within the focal area? Consider sage-grouse habitat needs and resilience and resistance. 2. What are the topographic characteristics and soils of the area? Verify soils mapped to the location and determine soil temperature/moisture regimes. Collect information on soil texture, depth and basic chemistry for restoration projects. 3. How will topographic characteristics and soils affect vegetation recovery, plant establishment and erosion? Evaluate erosion risk based on topography and soil characteristics. 4. What are the potential native plant communities for the area? Match soil components to their correlated ESDs. This provides a list of potential species for the site(s).
II. Determine current state of the site	5. Is the area still within the reference state for the ecological site(s)?
III. Select appropriate action	6. How far do sites deviate from the reference state? How will treatment success be measured? 7. Do sufficient perennial shrubs and perennial grasses and forbs exist to facilitate recovery? 8. Are invasive species a minor component? 9. Do invasive species dominate the sites while native life forms are missing or severely under represented? If so, active restoration is required to restore habitat. 10. Are species from drier or warmer ecological sites present? Restoration with species from the drier or warmer sites should be considered. 11. Have soils or other aspects of the physical environment been altered? Sites may have crossed a threshold and represent a new ecological site type requiring new site-specific treatment/restoration approaches.
IV. Determine post-treatment management	12. How long should the sites be protected before land uses begin? In general, sites with lower resilience and resistance should be protected for longer periods. 13. How will monitoring be performed? Treatment effectiveness monitoring includes a complete set of measurements, analyses, and a report. 14. Are adjustments to the approach needed? Adaptive management is applied to future projects based on consistent findings from multiple locations.

Ecological site descriptions: ESDs and their associated STMs provide essential information for determining treatment feasibility and type of treatment. ESDs are part of a land classification system that describes the potential of a set of climate, topographic, and soil characteristics and natural disturbances to support a dynamic set of plant communities (Bestelmeyer et al. 2009; Stringham et al. 2003). NRCS soil survey data (http://soils.usda.gov/survey/), including soil temperature/moisture regimes and other soil characteristics, are integral to ESD development. ESDs have been developed by the NRCS and their partners to assist land management agencies and private land owners with making resource decisions, and are widely available for the Sage-grouse MZs except where soil surveys have not been completed (for a detailed description of ESDs and access to available ESDs see: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/). ESDs assist managers to step-down generalized vegetation dynamics, including the concepts of resilience and resistance, to local scales. For example, variability in soil characteristics and the local environment (e.g., average annual precipitation as indicated by soil moisture regime) can strongly influence both plant community resilience to fire as well as the resistance of a plant community to invasive annual grasses after fire (table 1). Within a particular ESD, there is a similar level of resilience to disturbance and resistance to invasive annuals and this information can be used to determine the most appropriate management actions.

State and transition models: STMs are a central component of ecological site descriptions that are widely used by managers to illustrate changes in plant communities and associated soil properties, causes of change, and effects of management interventions (Stringham et al. 2003; Briske et al. 2005; USDA NRCS 2007) including in sagebrush ecosystems (Forbis et al. 2006; Barbour et al. 2007; Boyd and Svejcar 2009; Holmes and Miller 2010; Chambers et al. *in press*). These models use ***state*** (a relatively stable set of plant communities that are resilient to disturbance) and ***transition*** (the drivers of change among alternative states) to describe the range in composition and function of plant communities within ESDs (Stringham and others 2003; see Appendix 1 for definitions). The reference state is based on the natural range of conditions associated with natural disturbance regimes and often includes several plant communities (***phases***) that differ in dominant plant species relative to type and time since disturbance (Caudle et al. 2013). Alternative states describe new sets of communities that result from factors such as inappropriate livestock use, invasion by annual grasses, or changes in fire regimes. Changes or transitions among states often are characterized by ***thresholds*** that may persist over time without active intervention, potentially causing irreversible changes in community composition, structure, and function. ***Restoration pathways*** are used to identify the environmental conditions and management actions required for return to a previous state. Detailed STMs that follow current interagency guidelines (Caudle et al. 2013), are aligned with the ecological types (table 1), and are generally applicable to MZs III (Southern Great Basin), IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin) are provided in Appendix 5.

A generalized STM to illustrate the use of STMs is shown in figure 32 for the warm and dry Wyoming big sagebrush ecological type. This ecological type occurs at relatively low elevations in the western part of the range and has low to moderate resilience to disturbance and management treatments and low resistance to invasion (table 1). This type is abundant in the western portion of the range, but as the STM suggests, it is highly susceptible to conversion to invasive annual grass and repeated fire and is difficult to restore. Intact sagebrush areas remaining in the reference state within this ecological type are a high priority for conservation. Invaded states or locations with intact sagebrush that lack adequate native perennial understory are a high priority for restoration where they bridge large, contiguous areas of sagebrush. However, practical methods to accomplish this are largely experimental and/or costly and further development, including adaptive science and management, is needed.



Reference State - There is a continuum from shrub to grass dominance depending on time since fire and other factors like climate, insects, and pathogens.

Invaded State - An invasive seed source and/or improper grazing result in a transition to an invaded state. Perennial grass decreases and invasive grasses increase with improper grazing or stressors resulting in an at-risk phase. Management treatments and proper grazing are unlikely to result in return to the reference on all but cool and moist sites.

Annual State - Fire or other disturbances that remove sagebrush result in crossing a threshold to an annual state. Perennial grass is rare and recovery potential is low. Repeated fire causes further degradation.

Seeded State - Seeding following fire and/or invasive species control results in a seeded state. Sagebrush may establish on cooler and moister sites. Success and return to the reference state are related to site conditions, seeding mix, and post-treatment weather, and livestock use.

Figure 32. A state and transition model that illustrates vegetation dynamics and restoration pathways for the warm and dry, Wyoming big sagebrush ecological type. This ecological type occurs at relatively low elevations in the western part of the range and has low to moderate resilience to disturbance and management treatments and low resistance to invasion.

Monitoring and adaptive management: Monitoring programs designed to track ecosystem changes in response to both stressors and management actions can be used to increase understanding of ecosystem resilience and resistance, realign management approaches and treatments, and implement adaptive management (Reever-Morghan et al. 2006; Herrick et al. 2012). Information is increasing on likely changes in sagebrush ecosystems with additional stress and climate warming, but a large degree of uncertainty still exits. Currently, the NRCS National Resource Inventory is being used on private lands and is being implemented on public lands managed by BLM to monitor trends in vegetation attributes and land health at the landscape scale under the AIM (Assessment Inventory and Monitoring) strategy. Strategic placement of monitoring sites and repeated measurements of ecosystem status and trends (e.g., land cover type, ground cover, vegetation cover and height of native and invasive species, phase of tree expansion, soil and site stability, oddities) can be used to decrease uncertainty and increase effectiveness of management decisions. Ideally, monitoring sites span environmental/productivity gradients and sagebrush ecological types that characterize sage-grouse habitat. Of particular importance are (1) ecotones between ecological types where changes in response to climate are expected to be largest (Loehle 2000; Stohlgren et al. 2000), (2) ecological types with climatic conditions and soils that are exhibiting invasion and repeated fires, and (3) ecological types with climatic conditions and soils that are exhibiting tree expansion and increased fire risk. Monitoring the response of sagebrush ecosystems to management treatments, including both pre- and post-treatment data, is a first order priority because it provides information on treatment effectiveness that can be used to adjust methodologies.

Monitoring activities are most beneficial when consistent approaches are used among and within agencies to collect, analyze, and report monitoring data. Currently, effectiveness monitoring databases that are used by multiple agencies do not exist. However, several databases have been developed for tracking fire-related and invasive-species management activities. The National Fire Plan Operations and Reporting System (NFPORS) is an interdepartmental and interagency database that accounts for hazardous fuel reduction, burned area rehabilitation and community assistance activities. To our knowledge, NFPORS is not capable of storing and retrieving the type of effectiveness monitoring information that is needed for adaptive management. The FEAT FIREMON Integrated (FFI; https://www.frames.gov/partner-sites/ffi/ffi-home/) is a monitoring software tool designed to assist managers with collection, storage and analysis of ecological information. It was constructed through a complementary integration of the Fire Ecology Assessment Tool (FEAT) and FIREMON. This tool allows the user to select among multiple techniques for effectiveness monitoring. If effectiveness monitoring techniques were agreed on by the agencies, FFI does provide databases with standard structures that could be used in inter-agency effectiveness monitoring. Also, the National Invasive Species Information Management System (NISIMS) is designed to reduce redundant data entry regarding invasive species inventory, management and effectiveness monitoring with the goal of providing information that can be used to determine effective treatments for invasive species. However, NISIMS is currently available only within the BLM.

Common databases can be used by agency partners to record and share monitoring data. The Land Treatment Digital Library (LTDL [USGS 2010]) provides a method of archiving and collecting common information for land treatments and might be used as a framework for data storage and retrieval. Provided databases are relational (maintain a common field for connecting them), creating single corporate databases is not necessary. However, barriers that hinder database access within and among agencies and governmental departments may need to be lowered while still maintaining adequate data security. The LTDL has demonstrated how this can work by accessing a variety of databases to populate useful information relating to land treatments.

For effectiveness of treatments to be easily useable for adaptive management, the agencies involved will need to agree on monitoring methods and a common data storage and retrieval system. Once data can be retrieved, similar treatment projects can be evaluated to determine how well they achieve objectives for sage-grouse habitat, such as the criteria outlined in documents like the Habitat Assessment Framework (Stiver et al. 2006). Results of monitoring activities on treatment effectiveness are most useful when shared across jurisdictional boundaries, and several mechanisms are currently in place to improve information sharing (e.g., the Great Basin Fire Science Delivery Project; www.gbfiresci.org).

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Appendix 1. Definitions of Terms Used in This Document

At-Risk Community Phase — A community phase that can be designated within the reference state and also in alternative states. This community phase is the most vulnerable to transition to an alternative state (Caudle et al. 2013).

Community Phase — A unique assemblage of plants and associated soil properties that can occur within a state (Caudle et al. 2013).

Ecological Site (ES) — An Ecological Site (ES) is a conceptual division of the landscape that is defined as a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances (Caudle et al. 2013).

Ecological Site Descriptions (ESD) — The documentation of the characteristics of an ecological site. The documentation includes the data used to define the distinctive properties and characteristics of the ecological site; the biotic and abiotic characteristics that differentiate the site (i.e., climate, topography, soil characteristics, plant communities); and the ecological dynamics of the site that describes how changes in disturbance processes and management can affect the site. An ESD also provides interpretations about the land uses and ecosystem services that a particular ecological site can support and management alternatives for achieving land management (Caudle et al. 2013).

Ecological Type — A category of land with a distinctive (i.e., mappable) combination of landscape elements. The elements making up an ecological type are climate, geology, geomorphology, soils, and potential natural vegetation. Ecological types differ from each other in their ability to produce vegetation and respond to management and natural disturbances (Caudle et al. 2013).

Historical Range of Variability — Range of variability in disturbances, stressors, and ecosystem attributes that allows for maintenance of ecosystem resilience and resistance and that can be used to provide management targets (modified from Jackson 2006).

Resilience — Ability of a species and/or its habitat to recover from stresses and disturbances. Resilient ecosystems regain their fundamental structure, processes, and functioning when altered by stresses like increased CO_2 , nitrogen deposition, and drought and to disturbances like land development and fire (Allen et al. 2005; Holling 1973).

Resistance — Capacity of an ecosystem to retain its fundamental structure, processes and functioning (or remain largely unchanged) despite stresses, disturbances, or invasive species (Folke et al. 2004).

Resistance to Invasion — Abiotic and biotic attributes and ecological processes of an ecosystem that limit the population growth of an invading species (D'Antonio and Thomsen 2004).

Restoration Pathways — Restoration pathways describe the environmental conditions and practices that are required for a state to recover that has undergone a transition (Caudle et al. 2013).

State — A state is a suite of community phases and their inherent soil properties that interact with the abiotic and biotic environment to produce persistent functional and structural attributes associated with a characteristic range of variability (adapted from Briske et al. 2008).

State-and-Transition Model — A method to organize and communicate complex information about the relationships between vegetation, soil, animals, hydrology, disturbances (fire, lack of fire, grazing and browsing, drought, unusually wet periods, insects and disease), and management actions on an ecological site (Caudle et al. 2013).

Thresholds — Conditions sufficient to modify ecosystem structure and function beyond the limits of ecological resilience, resulting in the formation of alternative states (Briske et al. 2008).

Transition — Transitions describe the biotic or abiotic variables or events, acting independently or in combination, that contributes directly to loss of state resilience and result in shifts between states. Transitions are often triggered by disturbances, including natural events (climatic events or fire) and/or management actions (grazing, burning, fire suppression). They can occur quickly as in the case of catastrophic events like fire or flood, or over a long period of time as in the case of a gradual shift in climate patterns or repeated stresses like frequent fires (Caudle et al. 2013).

Appendix 2. An Explanation of the Use of Landscape Measures to Describe Sagebrush Habitat

Understanding landscape concepts of plant cover relative to typical management unit concepts of plant cover is important for prioritizing lands for management of sage-grouse. Ground cover measurements of sagebrush made at a management unit (for example, line-intercept measurements) should not be confused for landscape cover and may not relate well to landscape cover since the areas of examination differ vastly (square meters for management units and square kilometers for landscapes).

A landscape is defined rather arbitrarily as a large area in total spatial extent, somewhere in size between sites (acres or square miles) and regions (100,000s of square miles). The basic unit of a landscape is a patch, which is defined as a bounded area characterized by a similar set of conditions. A habitat patch, for example, may be the polygonal area on a map representing a single land cover type. Landscapes are composed of a mosaic of patches. The arrangement of these patches (the landscape configuration or pattern) has a large influence on the way a landscape functions and for landscape species, such as sage-grouse, sagebrush habitat patches are extremely important for predicting if this bird will be present within the area (Connelly et al. 2011).

Remotely sensed data of land cover is typically used to represent landscapes. These data may combine several sources of data and may include ancillary data, such as elevation, to improve the interpretation of data. These data are organized into pixels that contain a size or grain of land area. For example, LandSat Thematic Mapper spectral data used in determining vegetation cover generally have pixels that represent ground areas of 900 m^2 (30- x 30-m). Each pixel's spectral signature can be interpreted to determine what type of vegetation dominates that pixel. Groups of adjacent pixels with the same dominant vegetation are clustered together into polygons that form patches.

Landscape cover of sagebrush is determined initially by using this vegetation cover map, but a 'rolling window' of a predetermined size (e.g., 5 km^2 or 5,556 pixels that are 30- by 30-m in size) is moved across the region one pixel at a time. The central pixel of the 'window' is reassigned a value for the proportion of pixels where sagebrush is the dominant vegetation. The process is repeated until pixels within the region are completely reassigned to represent the landscape cover of sagebrush within for the region drawn from a 5 km^2 window.

Appendix 3. An Explanation of Soil Temperature and Moisture Regimes Used to Describe Sagebrush Ecosystems

Soil climate regimes (temperature and moisture) are used in Soil Taxonomy to classify soils; they are important to consider in land management decisions, in part, because of the significant influence on the amounts and kinds of vegetation that soils support. Soil temperature and moisture regimes are assigned to soil map unit components as part of the National Cooperative Soil Survey program. Soil survey spatial and tabular data for the Sage-grouse Management Zones (Stiver et al. 2006) were obtained for each State within the zones at the Geospatial Data Gateway (http://datagateway.nrcs.usda.gov/). Gridded Soil Survey Geographic (gSSURGO) file geodatabases were used to display a 10-meter raster dataset. Multiple soil components made up a soil map unit, and soil moisture and temperature regimes were linked to individual soil map components. Soil components with the same soil moisture and temperature class regime were aggregated, and the dominant soil moisture and temperature regime within each soil map unit was used to characterize the temperature and moisture regime. Only temperature and moisture regimes applicable to sagebrush ecosystems were displayed.

Abbreviated definitions of each soil temperature and moisture regime class are listed below. Complete descriptions can be found in *Keys to Soil Taxonsomy, 11th edition*, available at ftp://ftp-fc.sc.egov.usda.gov/NSSC/Soil_Taxonomy/keys/2010_Keys_to_Soil_Taxonomy.pdf.

Soil temperature regimes	
Cryic (Cold)	Soils that have a mean annual soil temperature of <8 °C, and do not have permafrost, at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Frigid (Cool)	Soils that have a mean annual soil temperature of <8 °C and the difference between mean summer and mean winter soil temperatures is >6 °C at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Mesic (Warm)	Soils that have a mean annual soil temperature of 8-15 °C and the difference between mean summer and mean winter soil temperatures is >6 °C at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Soil moisture regimes	
Ustic (summer precipitation)	Generally there is some plant-available moisture during the growing season, although significant periods of drought may occur. Summer precipitation allows presence of warm season plant species.
Xeric (Moist; generally mapped at >12 inches mean annual precipitation)	Characteristic of arid regions. The soil is dry for at least half the growing season and moist for less than 90 consecutive days.
Aridic (Dry; generally mapped at <12 inches mean annual precipitation)	Characteristic of arid regions. The soil is dry for at least half the growing season and moist for less than 90 consecutive days.

Note: Soil moisture regimes are further divided into moisture subclasses, which are often used to indicate soils that are transitional to another moisture regime. For example, a soil with an Aridic moisture regime and a Xeric moisture subclass may be described as "Aridic bordering on Xeric." Understanding these gradients becomes increasingly important when making interpretations and decisions at the site scale where aspect, slope, and soils affect the actual moisture regime on that site. More information on taxonomic moisture subclasses is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053576.

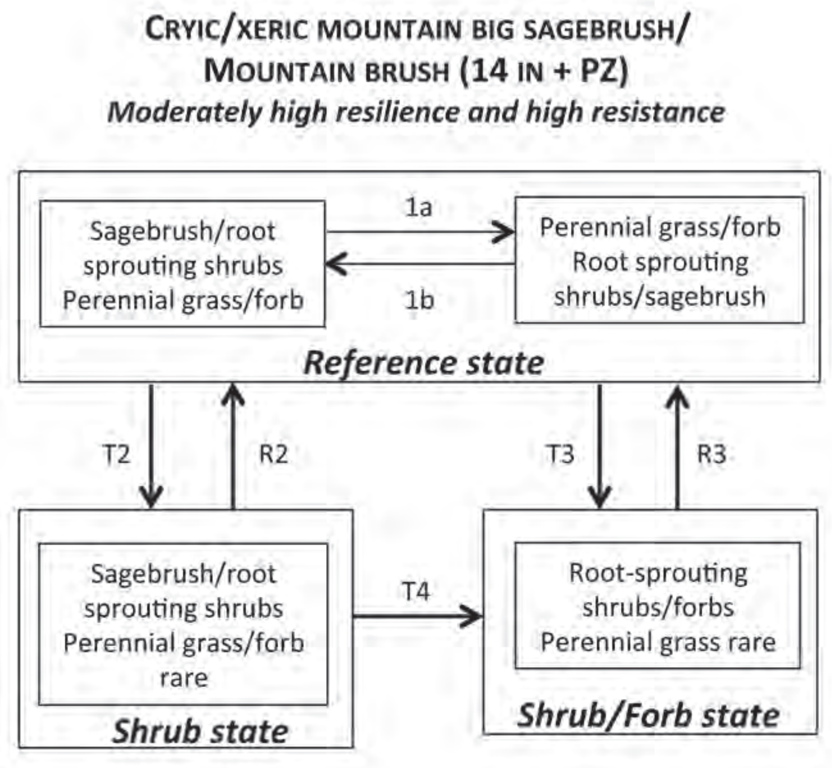
Appendix 4. Data Sources for the Maps in This Report

Dataset	Citation	Link
Geomac fire perimeters	Walters, S.P.; Schneider, N.J.; Guthrie, J.D. 2011. Geospatial Multi-Agency Coordination (GeoMAC) wildland fire perimeters, 2008. Data Series 612. Washington, DC: U.S. Department of the Interior, U.S. Geological Survey.6 p.	http://pubs.er.usgs.gov/publication/ds612
WFDSS fire perimeters	Butler, B. B.; Bailey, A. 2013. Disturbance history (Historical wildland fires). Updated 8/9/2013. Wildland Fire Decision Support System. Online: https://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml [Accessed 5 March 2014].	https://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml or https://wfdss.usgs.gov/wfdss/WFDSSData_Downloads.shtml
Piñon and juniper land cover	U.S. Geological Survery (USGS) National Gap Analysis Program. 2004. Provisional digital land cover map for the southwestern United States. Version 1.0. Logan, UT: Utah State University, College of Natural Resources, RS/GIS Laboratory.	http://earth.gis.usu.edu/swgap/landcover.html
Piñon and juniper land cover	U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 13 March 2014].	http://www.landfire.gov/NationalProductDescriptions21.php
Nevada invasive annual grass index	Peterson, E. B. 2006. A map of invasive annual grasses in Nevada derived from multitemporal Landsat 5 TM imagery. Carson City, NV: State of Nevada, Department of Conservation and Natural Resources, Nevada Natural Heritage Program.	http://heritage.nv.gov/node/167
Owhyee upland annual grass index	Peterson, E. B. 2007. A map of annual grasses in the Owyhee Uplands, Spring 2006, derived from multitemporal Landsat 5 TM imagery. Carson City, NV: State of Nevada, Department of Conservation and Natural Resources, Nevada Natural Heritage Program.	http://heritage.nv.gov/sites/default/files/library/anngrowy_text_print.pdf
Soil data (SSURGO)	Soil Survey Staff. 2014a. Soil Survey Geographic (SSURGO) Database. United States Department of Agriculture, Natural Resources Conservation Service. Online: http://sdmdataaccess.nrcs.usda.gov/. [Accessed 3 March 2014a].	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053627
Soil data (STATSGO)	Soil Survey Staff. 2014b. U.S. General Soil Map (STATSGO2) Database. United States Department of Agriculture, Natural Resources Conservation Service. Online: http://sdmdataaccess.nrcs.usda.gov/. [Accessed 3 March 2014b].	

Soil temperature and moisture regime data	Campbell, S. B. 2014. Soil temperature and moisture regime data for the range of greater sage-grouse. Data product. Portland, OR: USDA Natural Resources Conservation Service. Online: https://www.sciencebase.gov/catalog/folder/537f8be5e4b021317a872f1b?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal [Accessed 17 June 2014].	https://www.sciencebase.gov/catalog/folder/537f8be5e4b021317a872f1b?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal
Sage-grouse management zones	Stiver, S. J.; Apa, A. D.; Bohne, J. R.; Bunnell, S. D.; Deibert, P. A.; Gardner, S. C.; Hilliard, M. A.; McCarthy, C. W.; Schroeder, M. A. 2006. Greater Sage-grouse Comprehensive Conservation Strategy. Unpublished report on file at: Western Association of Fish and Wildlife Agencies, Cheyenne, WY.	
Breeding bird densities	Doherty, K. E.; Tack, J. D.; Evans, J. S.; Naugle, D. E. 2010. Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.	http://scholar.google.com/scholar?q=doherty+2010+breeding+bird&hl=en&as_sdt=0&as_vis=1&oi=scholart&sa=X&ei=JqQbU7HUAqfD2QW8xYFY&ved=0CCUQgQMwAA
Sagebrush land cover	U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 13 March 2014].	http://www.landfire.gov/NationalProductDescriptions21.php

Appendix 5. State-and-transition models (STMs) for five generalized ecological types for big sagebrush (from Chambers et al. *in press*; Miller et al. 2014 a, b)

These STMs represent groupings of ecological sites that are characterized by Wyoming or mountain big sagebrush, span a range of soil moisture/temperature regimes (warm/dry to cold/moist), and characterize a large portion of Management Zones III (Southern Great Basin), IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin). Large boxes illustrate states that are comprised of community phases (smaller boxes). Transitions among states are shown with arrows starting with T; restoration pathways are shown with arrows starting with R. The "at risk" community phase is most vulnerable to transition to an alternative state. Precipitation Zone is designated as PZ.



(1a) Perennial grass/forb increases due to disturbances that decrease sagebrush like wildfire, insects, disease, and pathogens.

(1b) Sagebrush and other shrubs increase with time.

(T2) Improper grazing triggers a shrub dominated state.

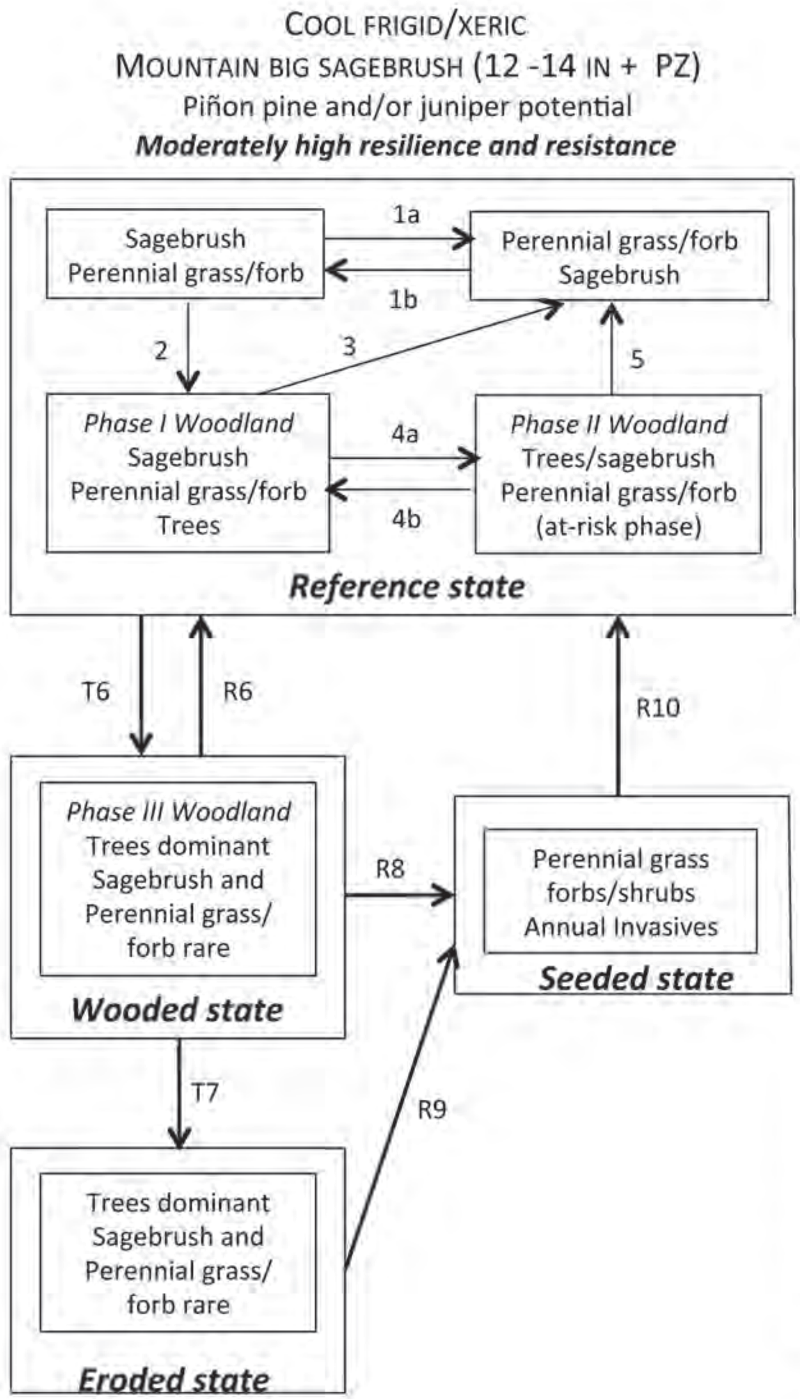
(R2) Proper grazing results in a return to the reference state.

(T3 and T4) Fire or other disturbances that remove sagebrush result in dominance by root-sprouting shrubs and an increase in native forbs like lupines.

(R3) Proper grazing and time result in return to the reference state.

Note: Resilience is lower on cold cryic sites due to short growing seasons.

Figure A.5A. STM for a cryic/xeric mountain big sagebrush/mountain brush ecological type characterized by moderately high resilience and high resistance.



(1a) Disturbances such as wildfire, insects, disease, and pathogens result in less sagebrush and more perennial grass/forb.

(1b) Sagebrush increases with time .

(2) Time combined with seed sources for piñon and/or juniper trigger a Phase I Woodland.

(3 and 5) Fire and or fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance.

(4a) Increasing tree abundance results in a Phase II woodland with depleted perennial grass/forb and shrubs and an at-risk phase.

(4b) Fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance.

(T6) Infilling of trees and/or improper grazing can result in a biotic threshold crossing to a wooded state with increased risk of high severity crown fires .

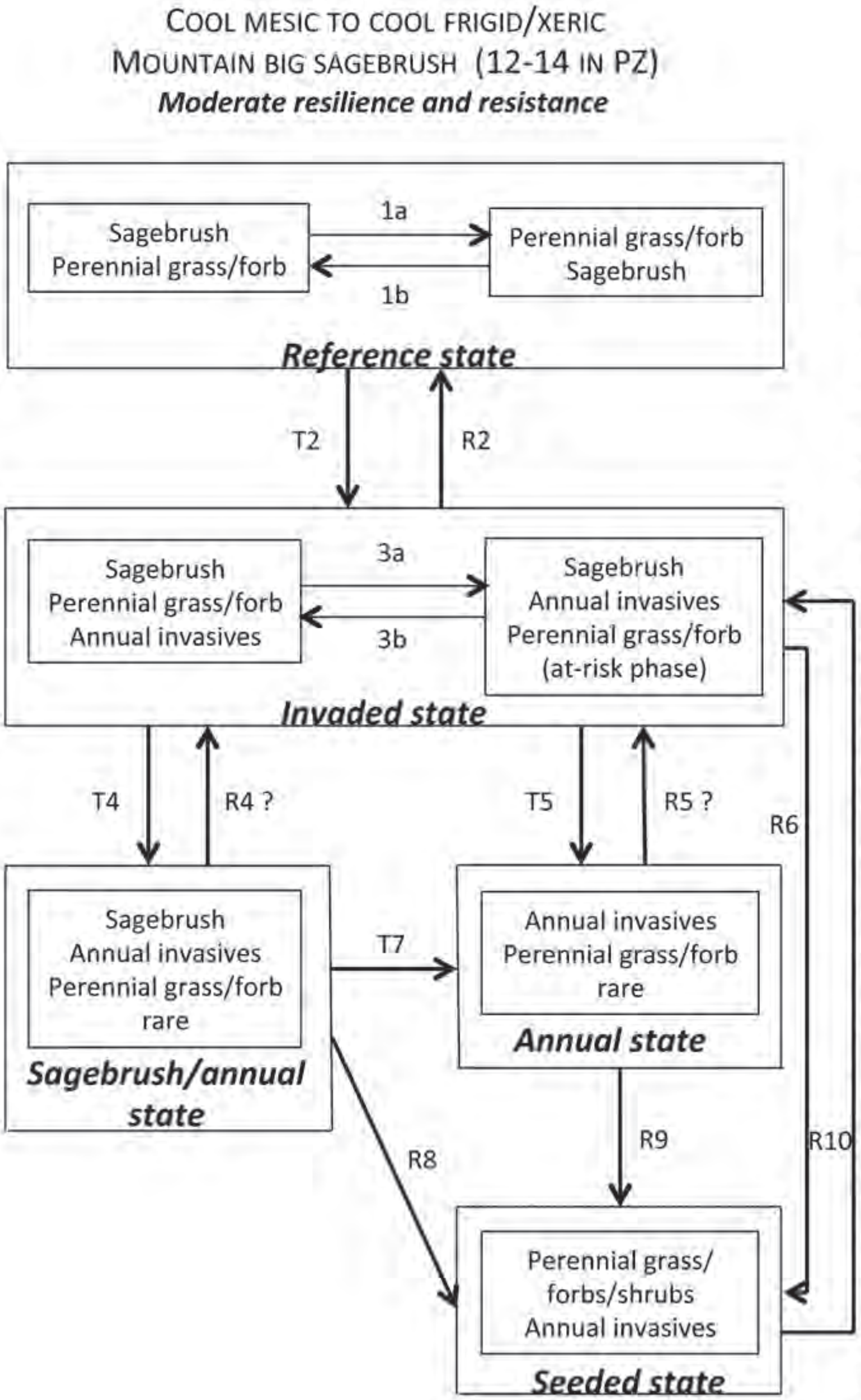
(R6) Fire, herbicides and/or mechanical treatments that remove trees may restore perennial grass/forb and sagebrush dominance.

(T7) An irreversible abiotic threshold crossing to an eroded state can occur depending on soils, slope, and understory species.

(R8 and R9) Seeding after fire may be required on sites with depleted perennial grass/forb, but seeding with aggressive introduced species can decrease native perennial grass/forb. Annual invasives are typically rare. Seeded eroded states may have lower productivity.

(R10) Depending on seed mix and grazing, return to the reference state may be possible if an irreversible threshold has not been crossed.

Figure A.5B. STM for a cool frigid/xeric mountain big sagebrush ecological type that has piñon pine and/or juniper potential and is characterized by moderately high resilience and resistance.



(1a) Perennial grass/forb increases due to disturbances that decrease sagebrush like wildfire, insects, disease, and pathogens.

(1b) Sagebrush increases with time .

(T2) An invasive seed source and/or improper grazing trigger an invaded state.

(R2) Proper grazing, fire, herbicides, and/or mechanical treatments may restore perennial grass/forb and sagebrush dominance with few invasives.

(3a) Perennial grass/forb decreases and sagebrush and invasives increase with improper grazing by livestock resulting in an at-risk phase. Decreases in sagebrush due to insects, disease or pathogens can further increase invasives.

(3b) Proper grazing, herbicides, or mechanical treatments that reduce sagebrush may increase perennial grass/forb and decrease invasives.

(T4) Improper grazing results in a sagebrush/annual state.

(R4) Proper grazing may facilitate return to the invaded state on cooler/wetter sites if sufficient grass/forb remains .

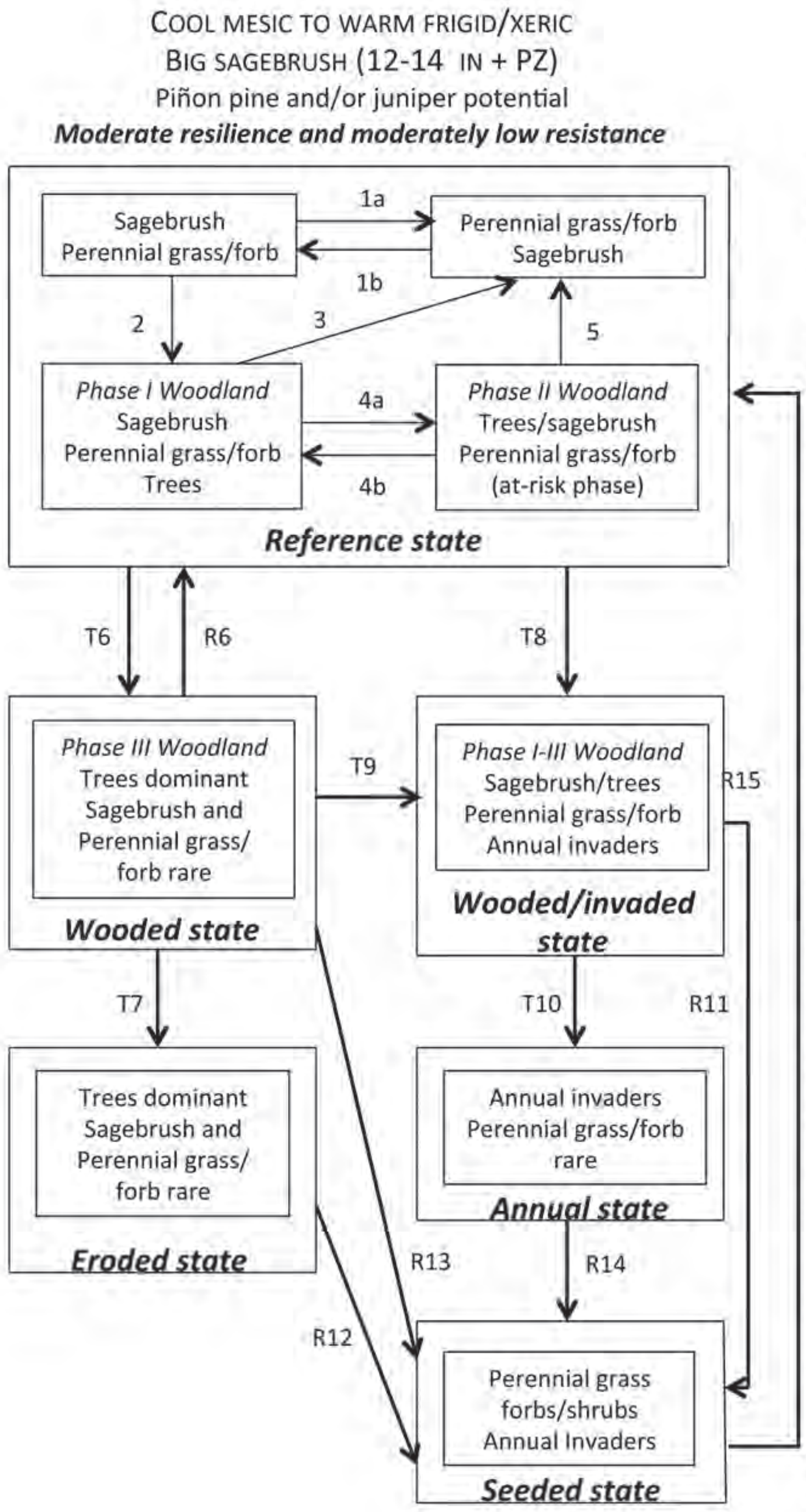
(T5 and T7) Fire or other disturbances that remove sagebrush result in an annual state. Perennial grass/forb are rare and recovery potential is reduced. Repeated fire can result in a biotic threshold crossing to annual dominance on warmer/drier sites, and root-sprouting shrubs may increase.

(R5) Cooler and wetter sites may return to the invaded or reference state with lack of fire, proper grazing, and favorable weather.

(R6, R8 and R9) Seeding following fire and/or invasive species control results in a seeded state. Sagebrush may recolonize depending on patch size, but annual invaders are still present.

(R10) Cooler and wetter sites may return to the invaded or possibly reference state depending on seeding mix, grazing and weather.

Figure A.5C. STM for a cool mesic to cool frigid/xeric mountain big sagebrush ecological type that is characterized by moderate resilience and resistance.



(1a) Disturbances such as wildfire, insects, disease, and pathogens result in less sagebrush and more perennial grass/forb.

(1b) Sagebrush increases with time .

(2) Time combined with seed sources for piñon and/or juniper trigger a Phase I Woodland.

(3 and 5) Fire and or fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance on cooler/wetter sites. On warmer/drier sites with low perennial grass/forb abundance resistance to invasion is moderately low.

(4a) Increasing tree abundance results in a Phase II woodland with depleted perennial grass/forb and shrubs and an at-risk phase.

(4b) Fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore sagebrush and perennial grass/forb dominance .

(T6) Infilling of trees and improper grazing can result in a biotic threshold crossing to a wooded state with increased risk of high severity crown fires.

(R6) Fire, herbicides and/or mechanical treatments that remove trees may restore perennial grass/forb and sagebrush dominance on cooler/wetter sites.

(T7) An irreversible abiotic threshold crossing to an eroded state can occur depending on soils, slope, and understory species.

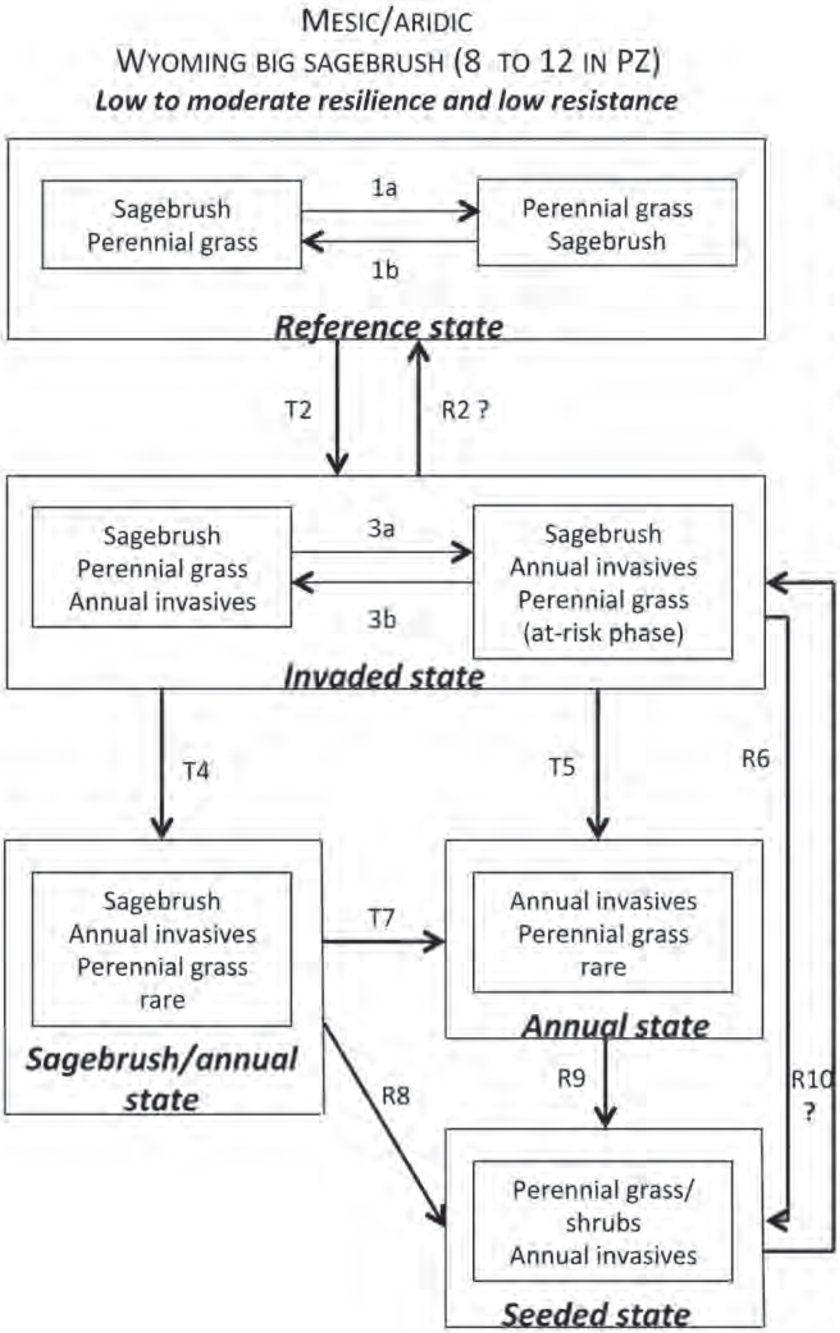
(T8 and T9) An invasive seed source and/or improper grazing can trigger a wooded/invaded state.

(T10) Fire or other disturbances that remove trees and sagebrush can result in a biotic threshold crossing to annual dominance on warmer/drier sites with low resilience.

(R11, R12, R13, and R14) Seeding after fire and/or invasive species control increases perennial grass/forb. Sagebrush may recolonize depending on seed sources, but annual invaders are still present. Seeded eroded states may have lower productivity.

(R15) Depending on seed mix , grazing, and level of erosion, return to the reference state may occur on cooler and wetter sites if an irreversible threshold has not been crossed.

Figure A.5D. STM for a cool mesic to warm frigid/xeric mountain big sagebrush ecological type type that has piñon pine and/or juniper potential and is characterized by moderate resilience and moderately low resistance.



(1a) Perennial grass increases due to disturbances that decrease sagebrush like wildfire, insects, disease, and pathogens.

(1b) Sagebrush increases with time .

(T2) An invasive seed source and/or improper grazing trigger an invaded state.

(R2) Proper grazing, fire, herbicides and/or mechanical treatments are unlikely to result in return to the reference state on all but the coolest and wettest sites.

(3a) Perennial grass decreases and both sagebrush and invasives increase with improper grazing resulting in an at-risk phase. Decreases in sagebrush due to insects, disease or pathogens can further increase invasives.

(3b) Proper grazing and herbicides or mechanical treatments that reduce sagebrush may restore perennial grass and decrease invaders on wetter sites (10-12"). Outcomes are less certain on drier sites (8-10") and/or low abundance of perennial grass.

(T4) Improper grazing triggers a largely irreversible threshold to a sagebrush/annual state.

(T 5 and T7) Fire or other disturbances that remove sagebrush result in an annual state. Perennial grass is rare and recovery potential is low due to low precipitation, mesic soil temperatures, and competition from annual invasives. Repeated fire can cause further degradation.

(R6, R8 and R9) Seeding following fire and/or invasive species control results in a seeded state. Sagebrush may recolonize depending on patch size, but annual invasives are still present.

(R10) Seeding effectiveness and return to the invaded state are related to site conditions, seeding mix, and post-treatment weather.

Figure A.5E. STM for a mesic/aridic Wyoming big sagebrush ecological type with low to moderate resilience and low resistance.

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7.16

Seidlitz, Aden <aseidlitz@blm.gov>

Fwd: 5 Gaps

1 message

Freeland, Joe <jfreeland@blm.gov> Fri, Apr 11, 2014 at 2:08 PM
To: Aden Seidlitz <aseidlitz@blm.gov>

FYI

---------- Forwarded message ----------
From: **Stangl, Kathryn** <kstangl@blm.gov>
Date: Fri, Apr 11, 2014 at 2:25 PM
Subject: 5 Gaps
To: Stephen Small <ssmall@blm.gov>, Karen Prentice <kprentic@blm.gov>, Joe Freeland <jfreeland@blm.gov>, Robert Bolton <rbolton@blm.gov>, Gordon Toevs <gtoevs@blm.gov>, Thomas Heinlein <theinlei@blm.gov>, Peggy Olwell <polwell@blm.gov>

Good Afternoon - FYI

Attached is the latest version of the 5 Gaps that I shared with Janet Lin yesterday.
She was going to review/edit and present it to Neil.

Thanks, Kathy

--

Joe Freeland
Senior Program Advisor
Office of Fire and Aviation
1849 C Street NW Room 5629
Washington, DC 20240
202-208-4147 (office)
208-871-4808 (Mobile)
jfreeland@blm.gov

Top 5 Gap Strategy 04.10.2014 Draft.docx
33K

The Honorable Brian Sandoval
Governor of Nevada
Carson City, Nevada 89701

Dear Governor Sandoval:

Thank you for your commitment to working with us to reduce the risks to the Greater Sage-grouse. Our collaborative efforts to protect and conserve habitat in areas where fire damage and invasive weeds are the greatest threat to the bird will be the key to the determination of whether or not the species gets listed.

One way to reduce fire damage is to increase our firefighting capability. As we have discussed on several occasions, we stand ready to assist you with training and the integration of Rangeland Fire Protection Associations (RFPAs) in to our fire suppression operations. Through our federal, state, local, and tribal partnerships, we are over 95 percent effective at stopping fires at less than 1,000 acres. ~~Our damage~~ Damage from wildfire comes from the less than five percent of fires that escape initial attack. In many cases, local first responders, RFPAs and Volunteer Fire Departments (VFDs) are first on the fire scene. I share the opinion of most of the Western Governors, that a citizen based response in the form of RFPAs and VFDs needs to be supported and strengthened where they exist and encouraged and developed where they do not.

~~Our damage comes from the less than five percent of fires that escape initial attack.~~ Science and history demonstrate that increasing suppression capacity alone will not significantly increase initial attack success. Various partners in the west use proactive fuels treatment measures such as mowing and green-stripping on existing roads and other disturbed areas to break up continuous fuel beds to improve firefighting effectiveness. There are challenges to this approach such as managing invasive plants and potential habitat fragmentation, but we are confident that if we and our partners do more of this work we can reduce the fire damage to property and resources.

We are committed to work with your office and Western Governors Association (WGA) to address these challenges. These suggestions are our initial thoughts and I am sure you may have many other ideas on ways we can collaboratively address this problem. We welcome your comments and suggestions on these ideas. Please let me know if you wish to discuss this in more detail. For specific information and coordination, please contact Joe Freeland at (202) 208-4147 or email at jfreeland@blm.gov

The BLM Response to the Western Association of Fish and Wildlife Agencies (WAFWA) Wildfire and Invasive Species Gap Analysis for the Great Basin.

April 10, 2012

1. **"Need for a long term pre and post fire fuels, stabilization, and restoration funding initiative."**
    - Sixty percent of the Healthy Lands and Fuels funds are allocated annually to benefit sage grouse through restoration activities.
    - Development of Healthy Lands Focus Areas positions BLM to strategically use regional mitigation funds and the potential new fire/resource program, Resilient Landscapes referenced in the FY15 President's Budget.
    - Will establish Healthy Lands and Fuels funding priorities for FY2016 – 2020 that address the threat of fire, invasive species and other landscape resilence priorities.
        - Identify national priorities with a geographical funding focus - Reduce random acts of restoration

    Needs:

    - Support current efforts to restructure the Suppression account and eliminate the need to "borrow" from existing accounts.
    - Modify business practices to support multi-year, all-lands projects and to simplify alignment of federal agency conservation programs with partner programs.
    - An annual funding increase ($30-50 million) to "fill the gap" of unfilled requests from the field.

2. **"Lack of comprehensive range-wide maps of vegetation types, ecological conditions, and soil surveys."**
    - Developing Ecological Site Descriptions (ESD) with NRCS and working to complete soil surveys to assist in vegetative and habitat potential mapping.
        - Outcomes: Landscape condition assessment (June 2014) and an occupied Greater Sage-grouse condition report (2015).
    - Pilot projects to accelerate the development and update of soil surveys and ESD by utilizing the key indicator information.
    - Incorporating the WAFWA resistance and resilience matrix into our plans to develop a strategic approach in addressing the treat of wildfire/invasive species.

    Needs:

    - Additional funds ($6 million) needed to satisfy the monitoring commitments in the proposed Greater Sage-grouse plans and plan amendments.

3. **"Need for improved seeding methods, seed mixes, and equipment used for post fire rehabilitation or habitat restoration."**
    - Host the "Seed Conference" in the summer of 2014 to increase strategic interagency cooperation and coordination of resources and science.
    - Using proven plan material (native and non-native) that is competitive, fire resistant, and effective in combating erosion and invasive plant establishment.
    - Seed Warehouse System updated to acquire the best seed, for the best value, maintained at state-of-the-art storage facilities.

    Needs:

    - Prioritize a research agenda with USGS and others that address plant establishment methods and techniques at both the individual plan and landscape scale levels.
    - Annual program increase ($20 million) to complete the work associated with a surge of native plant materials development and plant conservation for the Great Basin.

4. **There is a need for increased "rancher, private land owner, and agency (local, state and federal) fire management coordination. Similarly coordination between public land managers and private land owners such as Cooperative Weed Management Areas needs to be accelerated and funded throughout the range of the species.**
    - Approximately 20 Rangeland Fire Protection Associations (RFPA's) and over 200 Rural Volunteer Fire Departments (VFD's) in the Great Basin states that contribute to initial attack effectiveness in sage grouse habitat.
    - Providing training, funding, and coordination support to rural volunteer fire efforts in partnership with state agencies.
    - Encouraging, supporting, and integrating RFRP and VFD into all fire suppression activities.
    - Examine provisions within the 2014 Farm Bill that could be used to benefit sage grouse habitat and increase alignment of conservation efforts across state, federal and private lands.

    Needs:

    - Additional funds ($1-3 million) to support coordination with the DOI and Western Governors to develop a support structure for RFPA's and VFD's within the Great Basin.

5. **There is a "lack of necessary information, policy, and administrative support to adequately manage livestock grazing".**
    - Prioritizing use supervision and effectiveness monitoring of grazing activities to ensure compliance with permit conditions and health standards in Priority Habitat.
    - Prioritizing land health evaluations and permit renewals in sage grouse areas to determine if changes in livestock management are necessary in Priority Habitat.
    - Coordinating with permittees and others to implement changes in livestock grazing management including habitat treatments and structural improvements.
    - Coordinating with USGS to determine existing gaps in research to quantify, prioritize our immediate and future research needs (1 – 5 years).

    Needs:

    - Prioritize livestock grazing authorizations by implementing BLM policies as they relate to setting work priorities (Monitoring, Land Health Evaluations).
    - Long-term funding (minimum 5 years) of $15 million annually to increase permit renewals.
    - Legislation and rulemaking to streamline permit renewal processing.

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10/1/2015

Prepared in cooperation with the U.S. Fish and Wildlife Service

Long-Term Effects of Wildfire on Greater Sage-Grouse—Integrating Population and Ecosystem Concepts for Management in the Great Basin

Open–File Report 2015–1165

U.S. Department of the Interior
U.S. Geological Survey

Cover:
Top photograph: Sagebrush burning at Hart Mountain National Antelope Refuge in association with a management project located 65 miles northeast of Lakeview, Oregon. Photograph by Scott Shaff, U.S. Geological Survey, October 18, 2006.
Bottom photograph: Cheatgrass invasion following wildfire in Central Nevada north of Austin. Photograph by Caitlin Bowman, U.S. Geological Survey, August 2015.
Inset: Photograph of a male greater sage-grouse performing a courtship display on a lek in northeastern Nevada, 2012. Photograph courtesy of Tatiana Gettleman.

Long-Term Effects of Wildfire on Greater Sage-Grouse—Integrating Population and Ecosystem Concepts for Management in the Great Basin

By Peter S. Coates, Mark A. Ricca, Brian G. Prochazka, Kevin E. Doherty, Matthew L. Brooks, and Michael L. Casazza

Prepared in cooperation with the U.S. Fish and Wildlife Service

Open-File Report 2015–1165

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2015

The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

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ISSN 2331-1258 (online)

Preface

This study was conducted to provide timely scientific information regarding the effects of wildfire on greater sage-grouse (*Centrocercus urophasianus*) demography within the Great Basin over the last 30 years. Findings are provided to fill a prominent information gap in the threat assessment for greater sage-grouse populations as part of the listing decision process by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973. The primary purpose of the current report is to present a Bayesian approach to estimate the effects of wildfire on greater sage-grouse population rate of change while accounting for influential interactions with climatic conditions (that is, precipitation). We also used the derived parameters (medians from posterior probability distributions) of those relationships to estimate population size in 2044 relative to measured abundance in 2013–2014. The findings of this report were based on multiple long-term datasets, including 30 years (1984 to 2013) of wildfire history, and spatially explicit data of climatic conditions, soil moisture and temperature, and lek (breeding grounds) counts that were restricted to the 30-year analysis period. A complementary report using a wildfire dataset that spans the geographic range of greater sage-grouse was concurrently published with this report. The concurrent study focused on recent spatiotemporal patterns of fire regime characteristics during the same 30-year time period with implications for conservation and management of the greater sage-grouse (Brooks and others, 2015).

Acknowledgments

We greatly appreciate the cooperation of all State fish and wildlife agencies in the Great Basin who graciously provided lek count data under the auspices of the Western Association of Fish and Wildlife Agencies (WAFWA). These agencies included Idaho Department of Fish and Game, Nevada Department of Wildlife, Oregon Department of Fish and Wildlife, California Department of Fish and Wildlife, and Utah Division of Wildlife Resources. We extend particular gratitude to T. Remington (WAFWA), who compiled and diligently executed quality assurance and quality control for all lek data across agencies. We thank the WAFWA Wildfire and Invasives Work Group, specifically K. Mayer, J. Chambers, D. Pyke, D. Havlina, S. Espinosa, L. Niell, J. Maestas, T. Koch, and T. Hopkins for helpful suggestions on improving this presentation and analysis. We also are grateful to S. Campbell (NRCS) for providing soil moisture and temperature data. Reviews of previous manuscript drafts by B. Fedy (University of Waterloo), J. Dinkins (University of Wyoming), J. Yee (U.S. Geological Survey), and D. Delehanty were particularly helpful. B. Halstead and J. Yee (U.S. Geological Survey) provided expert statistical advice, and downscaled PRISM precipitation data were graciously provided by P. Flint and L. Flint (U.S. Geological Survey). Expert GIS analyses, data management, and problem solving were provided by T. Kroeger and K. Mauch (U.S. Geological Survey).

Contents

Figures

Tables

Conversion Factors

International System of Units to Inch/Pound

Multiply	By	To obtain
	Length	
millimeter (mm)	0.03937	inch (in.)
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
	Area	
square meter (m^2)	10.76	square foot (ft^2)
square meter (m^2)	0.0002471	acre
hectare (ha)	2.471	acre
square hectometer (hm^2)	2.471	acre
square kilometer (km^2)	0.3861	square mile (mi^2)
square kilometer (km^2)	247.1	acre

Long-Term Effects of Wildfire on Greater Sage-Grouse—Integrating Population and Ecosystem Concepts for Management in the Great Basin

By Peter S. Coates[1], Mark A. Ricca[1], Brian G. Prochazka[1], Kevin E. Doherty[2], Mathew L. Brooks[1], and Michael L. Casazza[1]

Abstract

Greater sage-grouse (*Centrocercus urophasianus*; hereinafter, sage-grouse) are a sagebrush obligate species that has declined concomitantly with the loss and fragmentation of sagebrush ecosystems across most of its geographical range. The species currently is listed as a candidate for federal protection under the Endangered Species Act (ESA). Increasing wildfire frequency and changing climate frequently are identified as two environmental drivers that contribute to the decline of sage-grouse populations, yet few studies have rigorously quantified their effects on sage-grouse populations across broad spatial scales and long time periods. To help inform a threat assessment within the Great Basin for listing sage-grouse in 2015 under the ESA, we conducted an extensive analysis of wildfire and climatic effects on sage-grouse population growth derived from 30 years of lek-count data collected across the hydrographic Great Basin of Western North America. Annual (1984–2013) patterns of wildfire were derived from an extensive dataset of remotely sensed 30-meter imagery and precipitation derived from locally downscaled spatially explicit data. In the sagebrush ecosystem, underlying soil conditions also contribute strongly to variation in resilience to disturbance and resistance to plant community changes (R&R). Thus, we developed predictions from models of post-wildfire recovery and chronic effects of wildfire based on three spatially explicit R&R classes derived from soil moisture and temperature regimes. We found evidence of an interaction between the effects of wildfire (chronically affected burned area within 5 kilometers of a lek) and climatic conditions (spring through fall precipitation) after accounting for a consistent density-dependent effect. Specifically, burned areas near leks nullifies population growth that normally follows years with relatively high precipitation. In models, this effect results in long-term population declines for sage-grouse despite cyclic periods of high precipitation. Based on 30-year projections of burn and recovery rates, our population model predicted steady and substantial long-term declines in population size across the Great Basin. Further, example management scenarios that may help offset adverse wildfire effects are provided by models of varying levels of fire suppression and post-wildfire restoration that focus on areas especially important to sage-grouse populations. These models illustrate how sage-grouse population persistence likely will be compromised as sagebrush ecosystems and sage-grouse habitat are degraded by wildfire, especially in a warmer and drier climate, and by invasion of annual grasses that can increase wildfire frequency and size in the Great Basin.

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[1] U.S. Geological Survey.

[2] U.S. Fish and Wildlife.

Introduction

Contemporary theoretical and applied ecology has focused increasingly on understanding the processes and management of alternative ecosystem states, whereby recognizing that disturbances can profoundly alter underlying processes that shape ecosystems and reorganizes community composition and species abundance (Scheffer and others, 2001; Beisner and others, 2003). Importantly, variation in disturbance intensity and effects on underlying processes can either allow an ecosystem to recover and ultimately retain its pre-disturbance state (that is, 'helpful resilience'), or drive it to a persistent alternative state with new functional processes once a disturbance threshold has been surpassed (that is, 'unhelpful resilience') (Standish and others, 2014). In the latter case, hysteresis can become operative if recovery is decoupled from pathways that maintained the pre-disturbance state (Suding and others, 2004). Moreover, lack of resistance to invading species can result in altered species composition following disturbance events, which can result in a positive feedback that drives an ecosystem further away from its original state (Suding and others, 2004). These state-changing mechanisms ultimately may yield an ecosystem that has no historical analog (Seastedt and others, 2008; Hobbs and others, 2009). Accordingly, emphasis recently has been placed on managing ecosystems for resilience to disturbance and resistance to invasive species (R&R). In this case, factors that may change ecosystem processes and disturbance thresholds are identified so that resources for restoration can be allocated most effectively and with a higher probability of success (Seastedt and others, 2008; Chambers and others, 2014a; Standish and others, 2014). Equally important is identifying how populations of constituent species inhabiting these ecosystems respond to disturbance and subsequent ecosystem transitions along ecologically meaningful time-frames (Agrawal and others, 2007). It follows that managing for R&R can be improved by integrating concepts from ecosystem and population ecology.

Habitat degradation within the Great Basin ecoregion of the Intermountain West of North America is a contemporary example of how disturbance is driving rapid changes in ecosystem structure and function across enormous spatial scales. The hydrographic Great Basin comprises more than 72.7 million ha across five States. The vastness of the affected area results in strong ecological and socio-political ramifications. Wildfire has been identified as a primary disturbance leading to shifts in ecosystem state and concomitant declines in sagebrush-steppe obligate species in the Great Basin (Brooks and Pyke, 2001; Connelly and others, 2011; Miller and others, 2011; Chambers and others, 2014b). Nearly all species of sagebrush (*Artemisia* spp.) in the Great Basin are killed by wildfire and do not re-sprout (Schlaepfer and others, 2014). At the landscape level, wildfire frequency and magnitude have increased significantly subsequent to invasion of annual grasses, particularly cheatgrass (*Bromus tectorum*) and medusahead-rye (*Taeniatherum canput-medusae*) following disturbance in the Great Basin. Annual grass invasion acts as a positive feedback for spreading wildfire to adjacent stands of intact sagebrush (that would otherwise be less likely to burn) and subsequent re-burning over shorter return intervals (for example, D'Antonio and Vitousek, 1992*;* Brooks and others, 2004; Chambers and others, 2007; Balch and others, 2013; Baruch-Mordo and others, 2013; Chambers and others, 2014a). Depending on local soil temperature and moisture regimes influencing variation in R&R (Chambers and others, 2014a, 2014b; Brooks and others, in press), the end result can be an ecosystem with novel, albeit deleterious and hysteretic, properties (for example, altered water and nutrient cycling, diminished wildlife and livestock value, and higher susceptibility to disturbance effects) (Miller and others, 2011).

From a population ecology perspective, greater sage-grouse (*Centrocercus urophasianus*, hereinafter referred to as "sage-grouse") are an umbrella or indicator species for the ecological health and integrity of sagebrush ecosystems at large spatial scales (Rowland and others, 2006; Knick and Connelly, 2011). Sage-grouse populations have declined concomitantly with the loss and degradation of sagebrush ecosystems and sage-grouse now occupy approximately one-half of their former range

(Schroeder and others, 2004; Knick and Connelly, 2011). Following an initial ruling of warranted but precluded (U.S. Fish and Wildlife Service, 2010), sage-grouse are now classified as warranted for listing under the Endangered Species Act (ESA) with a final determination scheduled for September 2015. Increased recognition of risks posed by interactions between wildfire, drought, and invasive annual grasses to the ecological and socio-economic integrity of sagebrush ecosystems and threats to the persistence of sage-grouse populations led to the recent issuance of Secretarial Order 3336, which aims to improve strategies for fire suppression and post-wildfire restoration across the Great Basin (U.S Department of the Interior, 2015).

Critical to these efforts is a sound understanding of how sage-grouse populations respond demographically to variation in the frequency and extent of wildfire, post-wildfire recovery times related to R&R, and interactions with climate and resource availability across large spatial scales. Most studies of sage-grouse–wildfire relations have been site-specific and focused either on effects of prescribed fire on sage-grouse population growth (Connelly and others, 2000a), movements and habitat associations (Fischer and others, 1996, 1997; Nelle and others, 2000; Rhodes and others, 2010), shorter-term (<10 year) effects of wildfire and climate on population growth (Blomberg and others, 2012) and habitat suitability (Davis and Crawford, 2014), or relied primarily on simulations (Pedersen and others, 2003). No analyses to date have linked multi-decadal patterns of wildfire across the Great Basin with concomitant data on sage-grouse population dynamics and climate. Such an analysis is important because it would provide a means for identifying mechanisms driving prevailing trends in sage-grouse population size and predict long-term population change while reducing the chance of mistaken inference arising from examining short-term data only. For example, given sage-grouse population cycles over time, examining short-term data alone may reveal transient spikes that run counter to actual long-term trajectories. Long-term evaluation may identify populations that are most at risk from wildfire or changing climate and lead to more effective targeting of management resources for conservation of sagebrush and sage-grouse populations.

Species using central-placed breeding strategies, such as lek breeding sage-grouse, are well-suited to spatially explicit and large-scale analyses of the effects of environmental and demographic stochasticity on population growth rate. One hypothesis of lek evolution posits that leks are located in nesting habitat where males are most likely to encounter females for breeding opportunities (Gibson and Langen, 1996), and several studies support this mechanism for sage-grouse (Schroeder and White, 1993; Gibson, 1996; Holloran and Anderson, 2005; Doherty and others, 2010, 2011; Coates and others, 2013). Hence, measurements of the extent and persistence of wildfire along with the timing and amount of precipitation within biologically relevant distances to leks should be good predictors of sage-grouse population growth rates determined from lek counts across the Great Basin. The prior absence of such an analysis across broad temporal and spatial scales in the Great Basin in large part is due to the difficulty in gathering lek count data, which normally is collected on a state-by-state basis, and forming spatially explicit wildfire and climate data from records within State and Federal databases. Now, these data have been compiled by the Western Association of Fish and Wildlife Agencies, Monitoring Trends in Burn Severity (Eidenshink and others, 2007), and PRISM Climate Group (Daly and others, 2008). In addition, spatially explicit data describing landscape-level variation in R&R based on measurable environmental gradients of elevation, aspect, and precipitation that influence soil temperature and moisture regimes in the Great Basin have been developed recently (Campbell, 2014; Chambers and others, 2014b). Hence, sage-grouse population trends can be linked directly to probabilities of ecosystem state transition and variation in post-wildfire recovery times derived from wildfire-related disturbance activity and underlying R&R, while simultaneously accounting for other sources of environmental (for example, precipitation) (Blomberg and others, 2012) and demographic (for example, density dependence) (Garton and others, 2011, 2015) stochasticity that can be similarly strong determinants of sage-grouse population growth patterns.

The objectives of the report were 3-fold:

1. Model sage-grouse population growth as a function of wildfire, precipitation, and density-dependence over a 30-year period (1985–2013) at leks with different underlying R&R properties across the Great Basin. Our modeling approach identifies influential environmental drivers that are thought to explain variation in population growth rates through time, rather than modeling growth rate explicitly as a function of time. Thus, factors that are thought to be responsible for the cyclic patterns (Fedy and Aldridge, 2011) of sage-grouse population growth were modeled explicitly.
2. Predict future (for example, next 30 years) patterns of sage-grouse population rate of change based on R&R-specific projections of cumulative burned area within close (that is, 5 km) proximity of breeding leks across the Great Basin while accounting for variation in precipitation and density-dependence effects.
3. Evaluate projected patterns of sage-grouse population decline across multiple example management scenarios that target varying levels of reduction of wildfire in areas with the greatest sage-grouse habitat quality and breeding densities.

Description of Study Area

Our study encompassed nearly 650,000 km^2 within the hydrographic boundary of the Great Basin. It comprises parts of five States (Nevada [43 percent], Utah [17 percent], Idaho [16 percent], Oregon [14 percent], and California [10 percent]) and four Sage-Grouse Management Zones (MZ III - Southern Great Basin [47 percent], MZ IV - Snake River Plain [33 percent], MZ V - Northern Great Basin [19 percent], and MZ II - Wyoming Basins [1 percent]) (fig. 1). Across the Great Basin, elevation ranges from 400 to 3,000 m within a mosaic of mountain ranges and lowland basins (Miller and others, 2013). Most precipitation falls in winter, and ranges annually from 150 to 300 mm in southern regions and at low elevations, and 300–400 mm in more northern regions and at mid-to-high elevations. Plant communities assemble along elevation and precipitation gradients, ranging from salt-desert shrublands in dry-lowland basins to Wyoming big sagebrush (*Artemisia tridentate wyomingensis*) associations in semi-arid regions to mountain big sagebrush (*Artemisia tridentata vaseyana*), mixed montane shrubland, pinyon pine (*Pinus* spp.) and juniper (*Juniperus* spp.) woodland, and coniferous forest associations in wetter and higher elevation regions.

The sampling area (grain) of our study specifically focused on areas within 5 km of sage-grouse leks, areas which primarily are comprised of sagebrush communities. These sagebrush communities occur on 63 percent of landscapes within the western range of sage-grouse populations (Brooks and others, 2015) and encompass over 80 percent of areas within 5 km of leks. Sagebrush communities can be partitioned into sagebrush steppe occupying more northern areas lying within high precipitation zones where sagebrush and perennial grasses co-dominate, and Great Basin sagebrush occupying drier and warmer southern areas where perennial grasses are less common (Küchler, 1970; Miller and others, 2011) with relatively low rates of annual net primary production (Noy-Meir, 1973). The timing and length of the wildfire season within the geographical range of sage-grouse in the Great Basin can vary widely among years, but generally begins in June and ends in September (Brooks and others, 2015). The amount of fire area, fire recurrence, and fire rotation also can vary widely among sage-grouse management zones and vegetation types in the Great Basin.

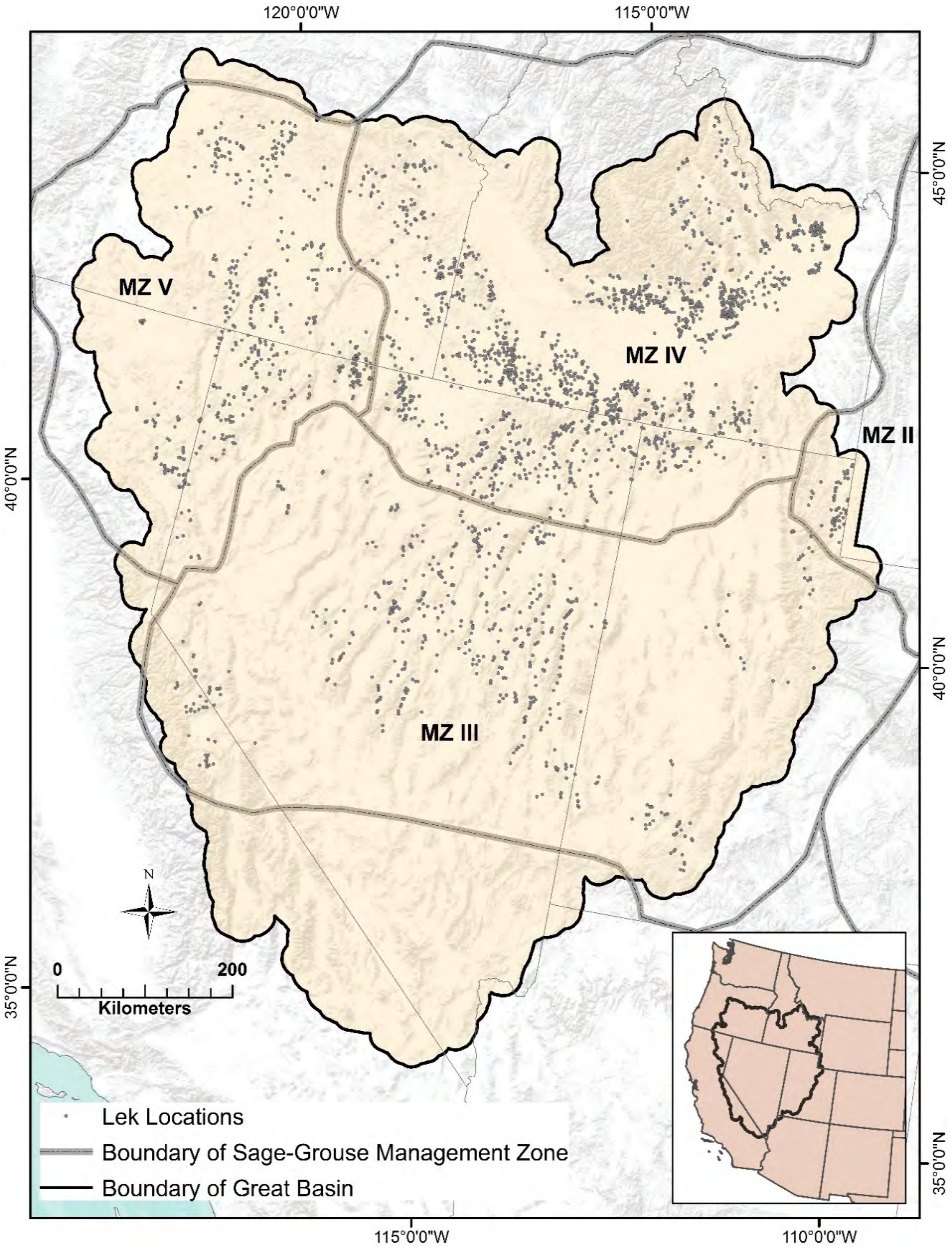

Figure 1. Map of the hydrographic Great Basin, sage-grouse management zones, and locations of sage-grouse leks.

Methods

Data Sources

Lek Counts

Counts of male sage-grouse attending breeding leks provide reliable and widely used spatially explicit data for analyses of population trends (Fedy and Aldridge, 2011). State fish and wildlife agencies use established protocols for defining leks, counting male sage-grouse at leks, and systematically searching for new leks. Counts of males at leks are typically conducted 3–4 times per season and the maximum count is recorded (Connelly and others, 2003). We used data from annual lek counts collected by all agencies within the Great Basin from 1985 to 2014. This time frame was selected to coincide with the range of available wildfire and climate data (see sections, “Annual Wildfire” and “Precipitation”). Because protocols and data treatments can vary slightly among agencies, data were compiled and subjected to further quality control and assurances (QA/QC) by the Western Association of Fish and Wildlife Agencies (2015). These QA/QC included: (1) removing counts obtained by aerial survey owing to lower probabilities of detection associated with this method; (2) removing counts obtained outside conventional calendar (March 15–May 15) periods and early morning hours (earlier than 0.5 hours before sunrise or later 1.5 hours after sunrise); (3) removing counts comprised entirely of birds of unknown gender; (4) combining leks within 1.2 km of each other in order to pool likely satellite leks into a single lek cluster; and (5) assuming that a recorded count of zero equaled no males were observed and a blank value indicated the lek was not counted or not available (NA); and (6) removing consecutive zero counts bracketed by non-zero–zero and zero–non-zero counts (see section, “Population Rate of Change”). For example, the sequence of counts {50, 0, 0, 0, 100} would become {50, 0, NA, 0, 100}; another sequence {50, 0, 0, 100} would stay {50, 0, 0, 100}; and {50, 0, 0, 0} would become {50, 0, NA, NA}.

Annual Wildfire

Spatially explicit data on wildfire extent and severity in the Great Basin extent from 1984 to 2013 were downloaded from the Monitoring Trends in Burn Severity (MTBS) database (http://mtbs.gov/index.html) (Eidenshink and others, 2007). Only burned surface areas greater than 405 ha as a result of wildfires were included in the Western United States portion of the MTBS database, yet these wildfires account for more than 95 percent of burned surface-area in the Western United States (Eidenshink and others, 2007) and 96 percent are within the range of the sage-grouse (Brooks and others, 2015). These data are generated by MTBS using several steps. Scenes are first identified using digitized fire histories from agency databases, other fire records, and peak photosynthetic activity estimates from Advanced Very High Resolution Radiometer (AVHRR) satellite data. Normalized burn ratio (NBR) indices are then calculated using thermal mapping (TM) bands from corresponding 30-m^2 Landsat pre- and post-fire imagery, where

$$\mathrm{NBR} = \frac{\mathrm{TM4}-\mathrm{TM7}}{\mathrm{TM4}+\mathrm{TM7}} \tag{1}$$

Bands of red light are measured with TM4 and longer short-wave infrared bands are measured with TM7. Values for differenced normalized burn ratios (dNBR) are then calculated by subtracting post- from pre-fire NBR values. Values for dNBR are then binned into five ecologically relevant fire severity classes: (0) increased greenness; (1) unburned to low, (2) low; (3) moderate; and (4) high. Fire perimeters are digitized around fire-severity classes 1 through 4, which indicate some minimum level of fire-associated changes in vegetation. Because we were most concerned with quantifying effects of wildfire stemming from fire-driven changes in vegetation (and not overestimating effects of wildfire on sage-grouse population growth), we excluded fire-severity class 1 values that likely result in minimal vegetation change, and reclassified fire-severity classes 2, 3, and 4 values into a single binary raster using Spatial Analyst in ArcGIS^{TM} 10.1. Hence, we erred on the side of reducing commission error rather than omission error (that is, we excluded those low-severity areas that may have actually burned rather than including low-severity areas that did not burn), and revised fire perimeters were redrawn around pixels representing likely vegetation change as a result of wildfire.

Precipitation

Spatially explicit data for local measurements of precipitation at a spatial resolution of 4 km from 1985 to 2013 were obtained from the PRISM Climate Group (http://www.prism.oregonstate.edu/), and then downscaled to 800 m (P. Flint and L. Flint, U.S. Geological Survey, unpub. data, 2014). We chose to index climatic effects on sage-grouse population rate of change according to variation in annual and seasonal precipitation (see section, “Model Covariates,” for rationale). We restricted our analyses to include variables related to precipitation to limit the number of covariates in our climatic model set, and because effects due to precipitation are more readily explained from a perspective of sage-grouse life-history (for example, relations between rainfall, primary productivity, and available resources for grouse) than from extremes in temperature, particularly for a cold-adapted gallinaceous species.

Resilience and Resistance

Extensive research effort in recent years has been devoted to determining how sagebrush ecosystem structure and function influences resilience to disturbance and resistance to annual grass invasion. In general, R&R increases along a gradient based on elevation and aspect that correlates with variation in soil moisture and temperature, where corresponding habitats with underlying cold or cool and moist soils have higher R&R than habitats with underlying warm and dry soils (Chambers and others, 2014a, 2014b). To create a landscape level surface depicting broad patterns in underlying R&R processes, three broad classes that index resilience to wildfire-related disturbance and resistance to annual grass invasion (that is, high, moderate, and low; table 1, fig. 2) were created by the Fire and Invasive Assessment Team (FIAT) from finer scale soil temperature and moisture subclass data extracted from maps developed by Campbell (2014). Although data were unavailable to classify some areas in the southern portion of the Great Basin, the R&R classification encompassed all sage-grouse leks and areas surrounding leks that were relevant to this analysis. We then used R&R index classes to calculate different recovery times in calculations of cumulative burned area and chronic wildfire effects (as described in section, “Wildfire”).

Table 1. Simplified index for overall resilience to disturbance and resistance to cheatgrass invasion (R&R) predicted by soil temperature/moisture regimes underlying sagebrush habitats in the Great Basin.

[Derived by the Fire and Invasive Assessment Team based on Chambers and others (2014b) and Campbell (2014). Sagebrush habitats excludes aquic or oxyaquic soils, which generally are too moist to support sagebrush species, as well as ustic (summer moist) moisture regimes (for example, wetlands, lakes)]

Soil temperature/moisture regime - moisture subclass	Common name	R&R index
Cryic/Xeric-Typic	Cold/moist	High
Cryic/Aridic bordering on Xeric	Cold/dry bordering on moist	High
Frigid/Xeric-Typic	Cool/moist	High
Cryic/Aridic-Typic	Cold/dry	Moderate
Cryic/Xeric bordering on Aridic	Cold/moist bordering on dry	Moderate
Frigid/Xeric bordering on Aridic	Cool/moist bordering on dry	Moderate
Frigid/Aridic-Typic	Cool/dry	Moderate
Frigid/Aridic bordering on Xeric	Cool/dry bordering on moist	Moderate
Mesic/Xeric-Typic	Warm/moist	Moderate
Mesic/Aridic bordering on Xeric	Warm/dry bordering on moist	Low
Mesic/Aridic-Typic	Warm/dry	Low
Mesic/Xeric bordering on Aridic	Warm/moist bordering on dry	Low

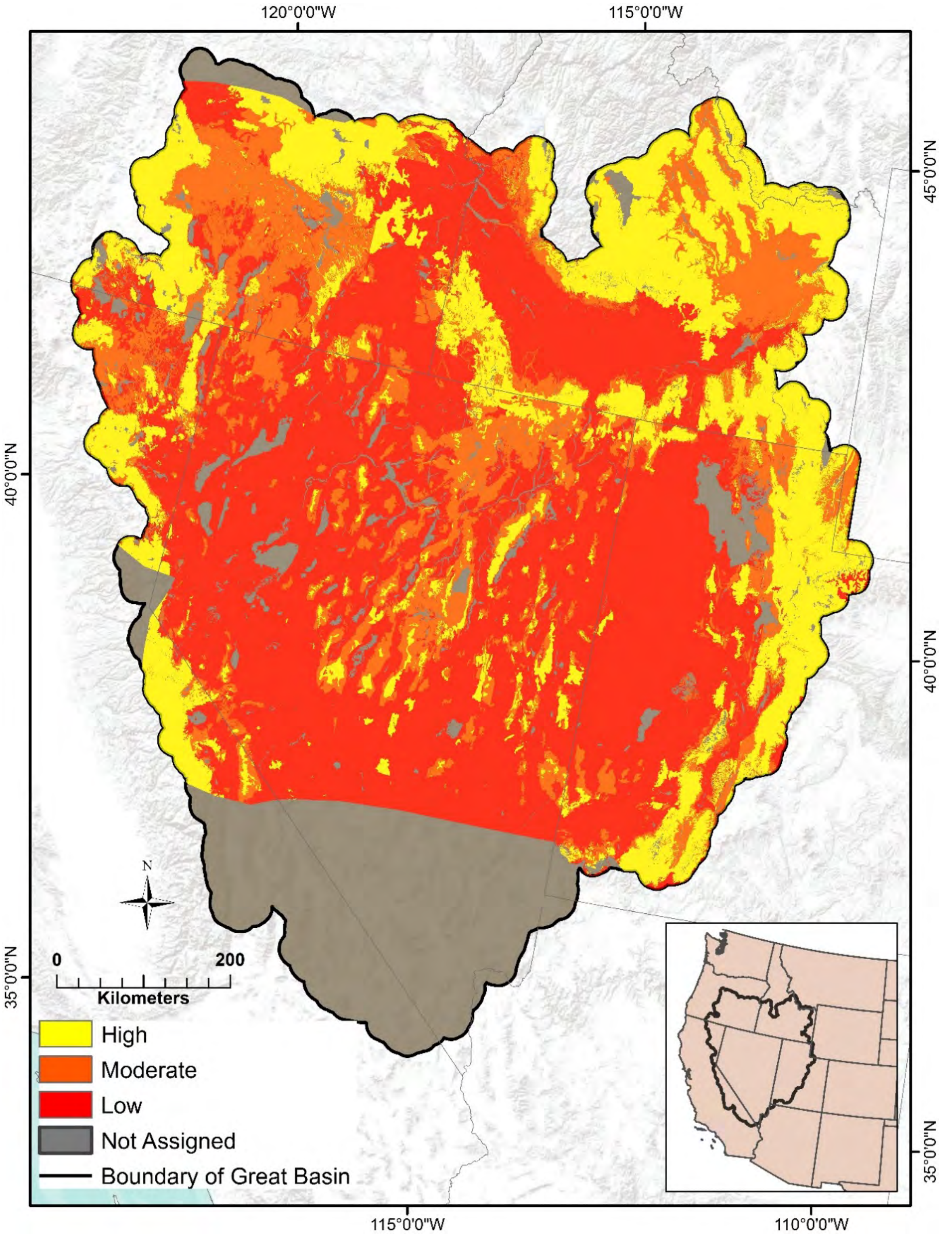

Figure 2. Map of Resilience and Resistance (R&R) index classes in the Great Basin. Classification of R&R were derived from soil moisture and temperature subclasses from Campbell (2014).

Model Response and Covariate

Population Rate of Change

We calculated the instantaneous (or intrinsic) annual per-capita rate of change (*r*; Gotelli and Ellison, 2004) for sage-grouse populations, which took the form:

$$r_{ij} = ln \frac{\mathrm{N}_{ij}}{\mathrm{N}_{ij-1}} \tag{2}$$

where N represents maximum male lek count, *i* represents lek, *j* represents year, and *j*-1 represents a previous year. We used *r* as the response variable in all predictive models for population growth (see section, “Modeling Wildfire and Climate Effects on Population Growth”). We added a constant of 0.1 to all counts to avoid division by zero when no birds were detected at N_{ij}. Where applicable for illustration and interpretation purposes, we convert to finite rates of change (λ; Caswell, 2001; Gotelli and Ellison, 2004), and expressed as:

$$\lambda = e^r \tag{3}$$

Density-Dependence

We formulated models to test and account for density-dependent reductions in population growth observed within some sage-grouse populations (Garton and others, 2011, 2015). Density-dependence from time-series data are typically evaluated using Ricker (Dennis and Taper, 1994) and Gompertz (Dennis and others, 2006) methods that estimate population rate of change as a function of raw and logarithmic abundance, respectively. Furthermore, time lags can be incorporated to model delayed density-dependent feedbacks that can yield cyclic patterns of population growth often displayed by sage-grouse in Wyoming (Fedy and Aldridge, 2011; Fedy and Doherty, 2011). Recent analyses of stochastic population growth from 1965 to 2013 found consistent support for Gompertz-type density-dependence lagged one-year log[N_{j-2}]); hereinafter, ‘lag-Gompertz’) across all sage-grouse management zones encompassed by our study area (Garton and others, 2015). To allow interpretation across studies, we *a priori* selected lag-Gompertz to be tested against the null model without predictors, and, if supported by the data, then carried this effect forward for inclusion in all predictive models.

Wildfire

Wildfire effects on sage-grouse population growth were indexed with three spatially explicit covariates derived from the MTBS data for each year: (1) distance to burned perimeter; (2) burned area; and (3) wildfire perimeter-to-area (PA) ratio (an index for amount burned to unburned edge). Distance to burned perimeter measured the Euclidean distance between lek centers and nearest burned edge (zero distance if lek was inside the fire area), and allowed for estimation of ‘burn over’ effects (for example, wildfires that completely burned over lek centers). Burned area and PA ratio within circular buffers of 5 km (78.5 km^2) and 10 km (314 km^2) from lek centers were extracted from raster layers created from corresponding moving windows of 5,160 and 10,560 m, respectively. These distances bracketed the range of values proposed for limiting surface-disturbance near leks (Coates and others, 2013; Manier and others, 2014) and encompassed most nesting habitat as described previously. Burned area represented the amount of fire-severity class 2 through 4 within a wildfire perimeter, and PA ratio represented the amount of total burned edge relative to its total area.

Burned area and PA ratio also were calculated with two methods. Annual time series analyses typically measure fire dynamics as a spatially static and ephemeral covariate, whereby landscapes burn at particular extents (area) and configurations (PA ratio) in a given year, but burns do not compound across years (that is, annual estimates of burn reset to zero at the conclusion of the fire year) (for example, Baker, 2006; Miller and others, 2011). We term this an 'acute' effect, whereby wildfire influences on population rate of change were modeled as a discrete process confined to a single year (for example, immediate effects of wildfire) (table 2). In contrast, wildfires can have long-lasting effects based on longer term reduction of resources necessary to sage-grouse (for example, loss of sagebrush cover and annual grass invasion), and the recovery time of these resources were then modeled as a function of underlying soil moisture and temperature processes influencing R&R. We term this a 'chronic' effect, whereby persistence of wildfire scars and associated effects on sage-grouse varied across years according to the predominant underlying R&R index class within 5 km of leks (for example, longer term effects of wildfire) (table 2). Evaluating both acute and chronic effects allowed for an investigation of immediate impacts (that is, temporary displacement of sage-grouse) versus those that are long-lasting and likely associated with changes in land cover (that is, reduced local persistence). Recovery times for chronically affected areas (hereinafter, chronic areas) were based on a published meta-analysis of post-wildfire recovery in mountain big sagebrush communities that ranged from 1.28 percent of pre-fire sagebrush per year ("slow-track") to 2.28 percent ("fast-track") per year (Baker, 2011). Mountain big sagebrush communities are among the most resilient of all big sagebrush types, and by assuming their fast-track and slow-track recovery rates for our high and moderate R&R index classes, respectively, we modeled a "best case scenario" of sagebrush recovery that likely underestimates the length of time to recovery for other sagebrush types (for example, Wyoming big sagebrush).

Table 2. Summary of fire recovery models used to evaluate how sage-grouse population growth rates were best explained by variation in post-recovery times relative to R&R index class.

[Years to recovery for high and moderate R&R classes were calculated as 20 percent divided *p*, where *p* is the fast-track (2.28 percent per year) or slow-track rate (1.28 percent per year) of recovery, respectively]

Fire effect	Recovery scenario	R&R index class	Years to recovery
Acute	NA	NA	1
Chronic	Normal	High	9
		Moderate	16
		Low	NA
	Accelerated	High	5
		Moderate	8
		Low	NA
	Decelerated	High	18
		Moderate	30
		Low	NA

By conservatively defining recovery as a minimum threshold of 20 percent pre-fire sagebrush cover within 5 km of leks necessary to fulfill important sage-grouse life history requirements (for example, brood-rearing and wintering) (Connelly and others, 2000b), we constructed three scenarios of 'normal', 'accelerated', and 'decelerated' recovery times for high and moderate R&R pixels. These scenarios represent variation in recovery times across a broader range of sagebrush ecosystems (Baker, 2006, 2011; Nelson and others, 2014). Under the 'normal' scenario, we calculated recovery time of high R&R pixels to 20 percent of pre-fire sagebrush using the fast-track rate (2.28 percent) as 9 years, (that is, 20 divided by 2.28, rounded to the nearest whole number) while recovery of moderate R&R pixels to 20 percent sagebrush using the slow-track rate (1.28 percent) occurred after 16 years (that is, 20 divided by 1.28, rounded to the nearest whole number). We cut normal recovery times approximately in one-half for the 'accelerated' scenario (5 and 8 years for high and moderate R&R pixels, respectively). We doubled recovery times under the 'decelerated' scenario but these were not allowed to exceed the 30-year span of the data (18 and 30 years for high and moderate R&R pixels, respectively). In all scenarios, the 'recovery clock' reset to zero if a new wildfire burned over a previously burned pixel with high or moderate R&R before recovery occurred. In contrast, we did not allow for any recovery in low R&R pixels, and assumed permanent conversion to annual grass following fire. This assumption was based on: (1) slow recovery following fire in Wyoming big sagebrush communities that often comprise low R&R habitat (for example, < 5 percent of pre-fire sagebrush cover typically returns after 25 years) (Miller and others, 2011); and (2) the high likelihood of state-transition without extensive management intervention (Chambers and others, 2014a, 2014b). Hence, burned low R&R pixels represented a permanent wildfire-scar and loss of resources available to sage-grouse.

We recognize that full recovery within 5 km of leks can take much longer than our three R&R-based recovery scenarios suggest. However, modeling full recovery in more resilient mountain big sagebrush and perennial grass communities or less resilient and low-elevation Wyoming big sagebrush communities was untenable because the 30 years of available MTBS data fell short of including the full range of years required for full recovery in both communities (ca. 25–120 years) (Baker, 2006, 2011). Hence, these assumptions allowed for relatively quick return of some recovery-based benefits to sage-grouse (based on an estimated post-fire 20 percent return of sagebrush) that ameliorated the chronic wildfire effect for leks dominated by high and moderate R&R, and no recovery in low R&R represented by cheatgrass invasion.

Precipitation

Similar to the wildfire covariates, we extracted mean precipitation data within 5- and 10-km radius buffers from lek centers using raster layers created from moving windows of 5,160 and 10,560 m, respectively. We aggregated precipitation into seasonal (spring, summer, fall, and winter) and annual intervals based on *a priori* hypotheses that synchronized with the timing of sage-grouse life stages. For example, spring spanned March to May and indexed resources available during the sage-grouse nesting period (for example, forb growth), whereas summer spanned June to August and indexed resources available during the brood-rearing period (for example, wet meadow productivity, delay of plant senescence). We classified fall as September through November to represent spurts of new growth during extended brood-rearing that could increase survival of juveniles entering winter. Winter spanned December to February, and indexed precipitation (primarily as snow) that contributed to increased runoff that was thought to drive more productive and possibly longer growing seasons. We also formed four multi-season groups by combining: (1) spring and summer (nesting + brood rearing); (2) spring, summer, and fall (nesting + brood rearing + extended brood rearing/juvenile); (3) winter, spring, and summer (snowpack runoff + nesting + brood rearing); and (4) annual (total across all seasons). Heavy snowfall during winter also can influence overwinter mortality and thus subsequent numbers of birds that survive to the following years' lek count (Anthony and Willis, 2009). However, other studies indicate relatively high over winter survival (Blomberg and others, 2013), so we aligned winter at the beginning rather than the end of the precipitation year to allow for carry-over effects of winter precipitation (for example, snowpack melt) on plant growth and phenology in the subsequent spring that should affect successful reproduction and increase the potential number of recruits in the next year.

Modeling Wildfire and Climatic Effects on Population Growth

A two-step Bayesian mixed-effects model framework was used to investigate density-dependence, precipitation, and wildfire as linear predictors for annual population growth rates from 1985 to 2013. Our mixed effects model equation is structured as

$$\log(\lambda) = \beta_0 + \sum_i \beta_i X_i + \zeta_{\text{Lek}} + \zeta_{\text{Year}} \tag{4}$$

where X_i represent model covariates to describe density-dependence, climate, and/or wildfire (absent in the null model), the β terms represent model coefficient parameters, and the ζ terms represent random effects variation among leks and years. Bayesian modeling is well suited for generating projections of growth rates and are readily derived from posterior distributions of parameter estimates (Halstead and others, 2011). Thus, we chose to use derived distributions for effects of wildfire (estimated while accounting for variation in precipitation and sage-grouse density) to forecast how future changes in cumulative burned area might influence population trajectories of Great Basin sage-grouse over the next 30 years. Posterior distributions were derived using Program JAGS within the rjags package (Plummer and others, 2015) in R version 3.1.1 (R-Core-Team, 2014). Specifically, posterior distributions of parameter estimates were generated from three chains of 10,000 iterations each, after a burn-in of 10,000 (step 1) to 20,000 (step 2) iterations using Markov-chain Monte Carlo (MCMC) methods. Convergence of MCMC output was assessed visually with history plots and the R-*hat* statistic, where values $\leq$ 1.1 indicated convergence (Gelman and others, 2014).

Posterior distributions of estimated covariate effects were derived from distributions of uninformative prior probabilities (table 3) during both steps, and all models were fitted with the random-effects structure to account for intraclass correlations associated with leks and years. Step 1 was designed to select and carry-forward the covariates with the most support from groups of variables representing: (1) density-dependence; (2) wildfire; and (3) precipitation. Input data were aligned so that wildfire and precipitation covariates at year *j* influenced numbers of grouse counted at leks in year *j*+1. Within groups, fitted models representing singular-additive effects were compared against each other, a null model (that is, random effects only), and a density-dependence only model (that is, lag-Gompertz with random effects; when applicable) using deviance information criterion (DIC, lower is better), a goodness-of-fit statistic calculated for every model. Although use of DIC for model selection has limitations (Hooten and Hobbs, 2014), this criteria is commonly used to rank competing Bayesian models because of its computational ease and similarity to maximum-likelihood based Akaike Information Criterion (AIC). Furthermore, we calculated DIC because this criteria is reliable when used with models with similar attributes to those in this study (for example, linear and independent data, large sample size, low number of parameters). We defined three different ΔDIC values to facilitate comparisons among models: $\Delta\text{DIC}_{\text{Group}}$ as DIC minus the minimum DIC value within the same group or subgroup, to compare models within each group or subgroup; $\Delta\mathrm{DIC}_{\mathrm{DD}}$ as DIC minus the DIC of the density-dependent-only model, to compare each model to the Gompertz (1-year lag) density-dependent model; and $\Delta\mathrm{DIC}_{\mathrm{null}}$ as DIC minus the DIC of the null model to compare each model to the random intercept-only model. For each subgroup, single covariate effects were carried forward if they met three criteria: (1) consisted of lowest DIC within the subgroup (that is, $\Delta\mathrm{DIC}_{\mathrm{group}}$ equaled zero); (2) DIC was at least two units less than DIC for the null model (that is, $\Delta\mathrm{DIC}_{\mathrm{null}}$ was less than or equal to negative two); and (3) DIC was at least two units less than DIC for the lag-Gompertz model (that is, $\Delta\mathrm{DIC}_{\mathrm{DD}}$ was less than or equal to negative two). Covariates from the models that met these DIC criteria for each group or subgroup were carried forward to step 2.

Table 3. Description of parameters in the mixed effects model for sage-grouse annual population rate of change (λ) in the Great Basin from 1985 to 2013, based on density, wildfire, climate, and interaction effects, and random effects among lek sites and years.

[All parameters are estimated using Bayesian techniques assuming minimal prior information, using Uniform (U) or Normal (N) prior distributions, and include baseline (β_0), coefficients of effects (β_i), random effects (ζ), and their standard deviations (σ). All effects relate to population λ according to the equation $\log(\lambda) = \beta_0 + \sum_i \beta_i X_i + \zeta_{\mathrm{Lek}} + \zeta_{\mathrm{Year}}$, where X_i represent model covariates and the summation includes zero (null model), one (lagged-Gompertz only model), or multiple effects]

Symbol	Description	Prior distribution
σ_{r}	Standard deviation for annual per capita instantaneous rate of increase (model error)	$\mathrm{U}(0,50)$
β_0	Baseline annual per capita instantaneous rate of increase	$\mathrm{U}(-20,20)$
β_{DD}	Coefficient of lagged Gompertz density-dependence effect	$\mathrm{N}(0,\sigma_{\mathrm{DD}})$
σ_{DD}	Prior standard deviation β_{DD}	$\mathrm{U}(0,50)$
β_{FDist}	Coefficient of fire effect (Distance subgroup)	$\mathrm{N}(0,\sigma_{\mathrm{FDist}})$
σ_{FDist}	Prior standard deviation for β_{FDist}	$\mathrm{U}(0,50)$
β_{FArea}	Coefficient of fire effect (Area subgroup)	$\mathrm{N}(0,\sigma_{\mathrm{FArea}})$
σ_{FArea}	Prior standard deviation for β_{FArea}	$\mathrm{U}(0,50)$
β_{Edge}	Coefficient of fire effect (Edge subgroup)	$\mathrm{N}(0,\sigma_{\mathrm{Edge}})$
σ_{Edge}	Prior standard deviation for β_{FEdge}	$\mathrm{U}(0,50)$
β_{Precip}	Coefficient of precipitation effect	$\mathrm{N}(0,\sigma_{\mathrm{Precip}})$
σ_{Precip}	Prior standard deviation of β_{Precip}	$\mathrm{U}(0,50)$
$\beta_{\mathrm{Interaction}}$	Coefficient of interaction effect between fire and precipitation	$\mathrm{N}(0,\sigma_{\mathrm{Interaction}})$
$\sigma_{\mathrm{Interaction}}$	Prior standard deviation for $\beta_{\mathrm{Interaction}}$	$\mathrm{U}(0,50)$
$\zeta_{\mathrm{Lek\ s}}$	Random lek effect, for lek s, where s = 1,…,1770	$\mathrm{N}(0,\sigma_{\mathrm{Lek}})$
σ_{Lek}	Prior standard deviation for $\zeta_{\mathrm{Lek\ s}}$	$\mathrm{U}(0,50)$
$\zeta_{\mathrm{Year\ s}}$	Random year effect, for year t, where t = 1985 – 2013.	$\mathrm{N}(0,\sigma_{\mathrm{Year}})$
σ_{Year}	Year standard deviation of $\zeta_{\mathrm{Year\ t}}$	$\mathrm{U}(0,50)$

During step 1, within the density-dependence group, we evaluated a lag-Gompertz model against the null model. The DIC was less than that of the null model, so we carried it forward for inclusion in all models within the wildfire and precipitation groups to consistently account for density-dependence. Within the wildfire group, we created three subgroups of covariates to singularly evaluate the effects of: (1) distance to burned perimeter; (2) burned area; and (3) burned edge. Distance to burned perimeter only included distance to acutely affected burned areas (hereinafter, acute distance). Burned area and PA ratio were based on acutely and chronically affected areas at the 5- and 10-km scale. Chronically affected burn and edge (hereinafter, chronic area and chronic edge) included measurements of cumulative area calculated using the different R&R-based recovery rates (that is, normal, accelerated, decelerated). Within the precipitation group, we used the same criteria to carry-forward the single-best model of seasonal or annual precipitation at the 5- or 10-km scale. Precipitation did not include any subgroups. All wildfire and precipitation covariates were centered and standardized using Z-scores (Zar, 1996) to allow for consistent scales of measurement and improve model convergence. Density-dependence variable represented by lag-Gompertz conversion was already log-transformed.

In step 2, we fit two additive models that combined lag-Gompertz with wildfire and precipitation covariates carried forward from step 1. We also fit a model that included an interaction between the effects of precipitation and wildfire to test if wildfire effects on population rate of change varied by precipitation. The model with the lowest DIC was chosen for predictive modeling. Multicollinearity among covariates ($r > |0.65|$) was not detected among any step 2 models. We followed the suggestions of Kéry (2010) to assess model fit by constructing plots of residuals against predicted values, developing posterior predictive distributions, and calculating Bayesian *p*-values, whereby $p \sim 0.5$ indicates good fit. We reduced the number of posterior iterations to 1,000 owing to the large number of parameters required for calculating residual plots, and increased the burn-in to 20,000 iterations to facilitate better convergence for more complex models. To interpret covariate effects, we report the median parameter estimates of the posterior distribution and 95 percent credible intervals (CI; that is, 2.5 and 97.5 percentiles of the posterior distribution that represent the lower and upper bounds, respectively, of the CI).

Modeling Cumulative Burned Area in Relation to Leks

A Bayesian linear model was used to describe increases in cumulative burned area through time from 1984 to 2014, and resulting posterior distributions were then used to forecast future changes in cumulative burned area out to 30 years. We selected the burned area covariate from a subgroup of models formed to test different combinations of spatial scale (that is, 5 and 10 km from lek) and acute and chronic R&R-based recovery times (that is, accelerated, normal, decelerated) that best described variation in annual population change (described in step 1 above), and regressed it against year as a continuous fixed effect. Separate models were run for each R&R index class to evaluate changes in burned area near leks over time relative to spatially explicit predictions of R&R, and then each model was compared to a null (intercept only) model using DIC. Parameter estimates were derived from distributions of uninformative prior probabilities (table 4).

Table 4. Description of parameters in the model for estimating change in cumulative fire area within 5-km of leks in the Great Basin from 1984 to 2013.

[All parameters are estimated using Bayesian techniques assuming minimal prior information, using Uniform (U) or Normal (N) prior distributions, and include coefficients of trend (β_{Year}), and standard deviations (σ). Cumulative fire area is modeled as $\beta_{\mathrm{Year}}\,Year$]

Symbol	Description	Prior distribution
σ_{r}	Standard deviation for annual rate of recovery	$\mathrm{U}(0{,}1.5e7)$
β_{Year}	Mean effect for year	$\mathrm{N}(0, \sigma_{\mathrm{Year}})$
σ_{Year}	Standard deviation for year effect	$\mathrm{U}(0{,}1.5e7)$

Management Scenarios

Indices of habitat suitability and animal abundance provide useful proxy-based measures for use in adaptive management (Coates and others, 2014; Stephens and others, 2015). Doherty and others (U.S. Fish and Wildlife Service, written commun., 2015) derived a range-wide population index model for sage-grouse using such indices that incorporated sage-grouse habitat suitability generated from Random Forest models (Evans and others, 2011), and spatially explicit abundance measures based on fixed kernel density functions on lek locations. The kernels were generated using two bandwidth distances representing the majority of breeding habitat in relation to leks (6.4 km) and seasonal movements (18.0 km). We evaluated relationships between abundance indices and the overall population index model to demarcate areas that are the most meaningful to sage-grouse populations. Specifically, we clipped the range-wide continuous population index layer to the Great Basin study extent (buffered by 10 km), and extracted isopleths for the percentage of cumulative volume under the layer at 5 percent increments starting at 65 percent. Following Doherty and others (2015), we overlaid locations of active leks (that is, greater than two males observed in greater than two of the previous 5 years) and pending leks (that is, greater than two males observed only once over the previous 5 years) on the clipped layer and extracted the maximum lek count from 2009 to 2014 as an index of population size within each isopleth class. Active and pending leks (*n* = 1,896) had at least one count greater than two males during the time interval. For each successive isopleth class, we calculated the ratio of the cumulative increase in population size to cumulative area added to the population index model, and rescaled the ratio between zero and 100. To determine a cut-point for the population index model that represented where sage-grouse density was most concentrated, we fit an exponential regression between population index model isopleth values and the cumulative ratio of increasing population size to area added, and determined where the slope of the line equaled 1.0 (Vander Wal and Rodgers, 2012). The slope equaled 1.0 at the 76.4 percent isopleth, which when rounded to 75 percent was used to demarcate example ‘core areas’ (fig. 3). To inform decisions of conservation actions by State and Federal agencies, we ran simulations to examine how targeted 25, 75, and 99 percent reductions in the rate (trend) of annual cumulative burned area in these core areas might alter sage-grouse population trajectories over the next 30 years. Posterior distributions are reported.

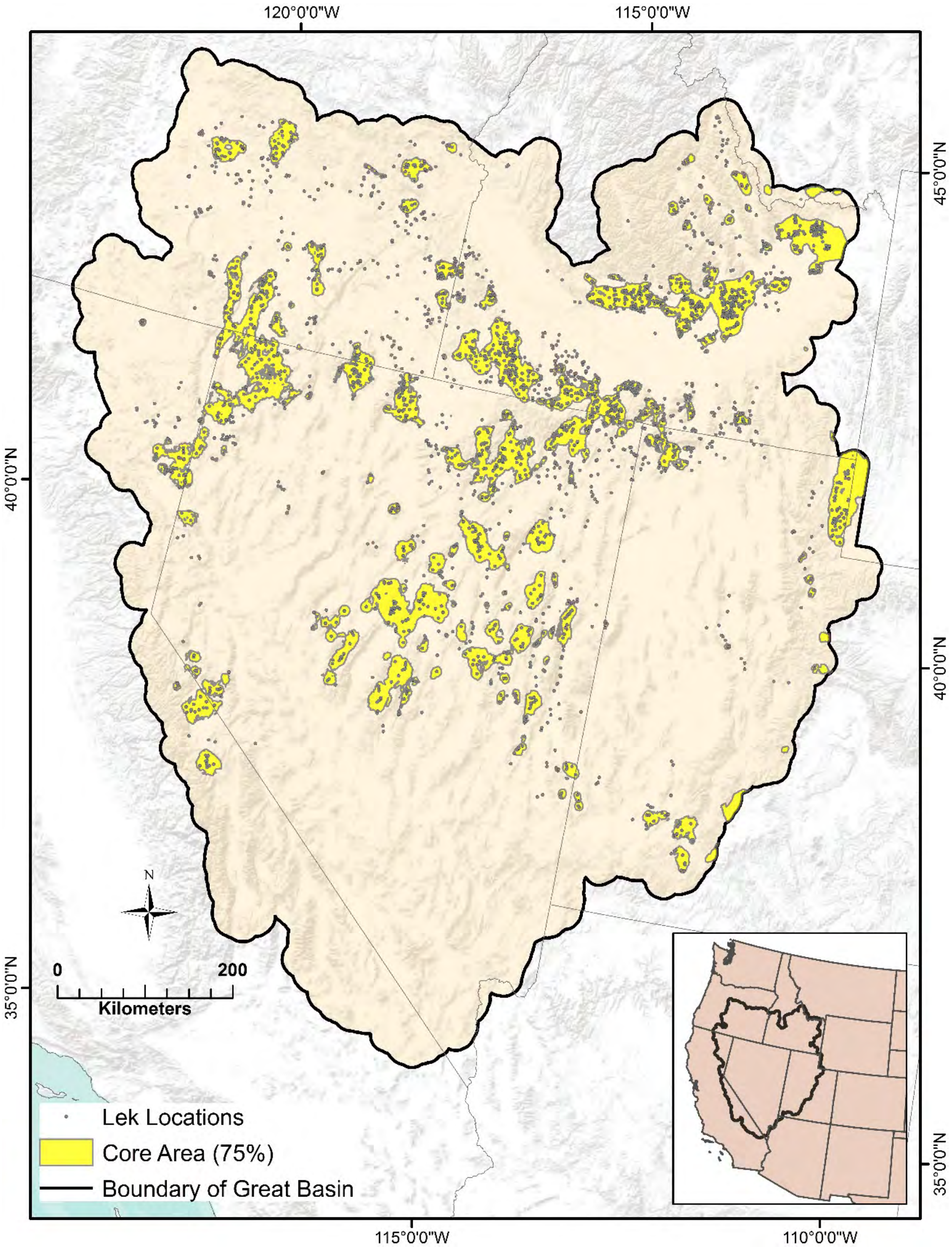

Figure 3. Map of estimated sage-grouse core areas and associated distribution of breeding leks in the Great Basin.

Results of Wildfire Effects on Sage-Grouse

General 30-Year Wildfire Patterns across the Great Basin

The MTBS-based dataset used for wildfire modeling comprised a pool of 3,102 fire perimeters in the Great Basin from 1984 to 2013. Although substantial variation existed among years, total burned area increased by an average of 153 km^2/yr. Some variation could be explained by annual precipitation relative to the 30-year average of precipitation (32.3 cm), where total burned area was greater, on average, during years of below-average precipitation (524,134 ha burned per year) compared to those years of above average precipitation (239,873 ha burned per year) (fig. 4). Additional variation could be explained by R&R index class burned, whereby total burned area tended to be higher for wildfires burning over land cover with low underlying R&R compared to those with moderate and high underlying R&R (fig. 5). When evaluated on a cumulative basis that allowed for normal recovery (based on results below) a total of 13,173 km^2 of land cover with low underlying R&R burned from 1984 to 2013 compared to 6,390 km^2 of moderate and 4,349 km^2 of high underlying R&R during the same period (fig. 6). We assumed all land cover types within these generalized R&R classes recovered at the same R&R-specific rates as sagebrush for illustrative purposes, and because this calculation is across the Great Basin and our analysis is in relation to 5 km of leks, this trend was not used for model projections.

Wildfire and Precipitation Effects on Annual Population Rate of Change

After subjecting all lek count data to QA/QC screening, the final dataset used to model wildfire and precipitation effects on annual population rate of change comprised of 1,770 leks across the Great Basin (table 5). Idaho and Nevada had the most leks (69.8 percent of total) and California had the least (4.6 percent of total). Average number of males per lek was less than 30. Posterior distributions of parameters were then generated from 14,834 estimates of instantaneous population rate of change (r) derived from consecutive pairs of lek counts.

For step 1, Gompertz type density-dependence with a 1-year lag (lag-Gompertz) explained more variance in annual population growth than the null (random effects only), and was thus carried forward to all models with wildfire and precipitation covariates (table 6). Within the wildfire covariate group, the model with distance to burned perimeter had a lower DIC compared to the random intercept model ($\Delta DIC_{null} < -72.0$) and the lag-Gompertz only model ($\Delta DIC_{DD} < -8.0$), so this covariate was carried forward to step 2. Within the burned area subgroup, chronic area with normal recovery rate within 5 km of a lek had the lowest DIC compared to the random intercept model, and was 6.8 ΔDIC_{DD} units better than the lag-Gompertz only model, so this covariate was carried forward to step 2.

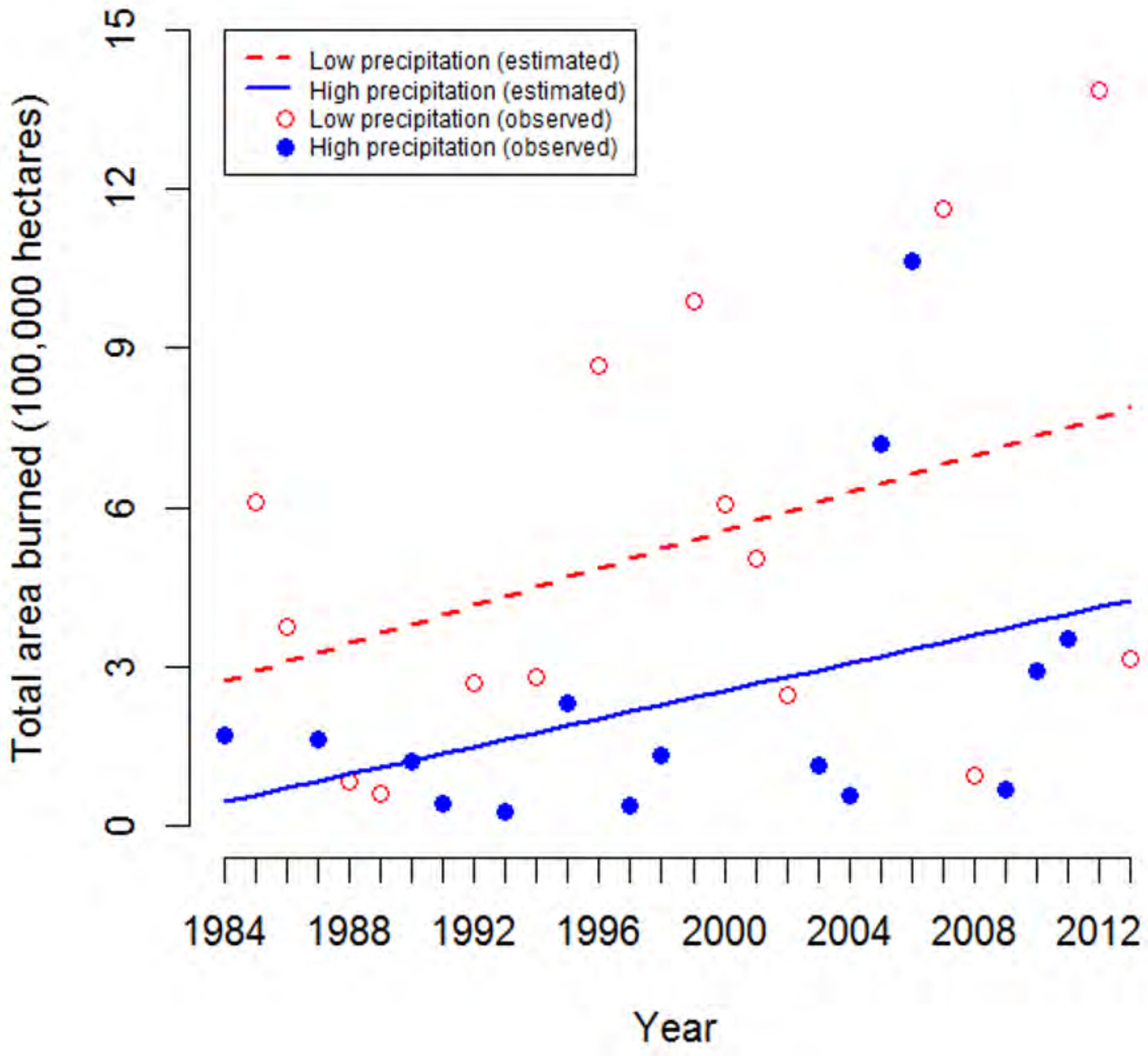

Figure 4. Relation between total burned area (acute) and time by low (<32.3 cm) and high (>32.3 cm) precipitation years in the Great Basin from 1984 to 2013.

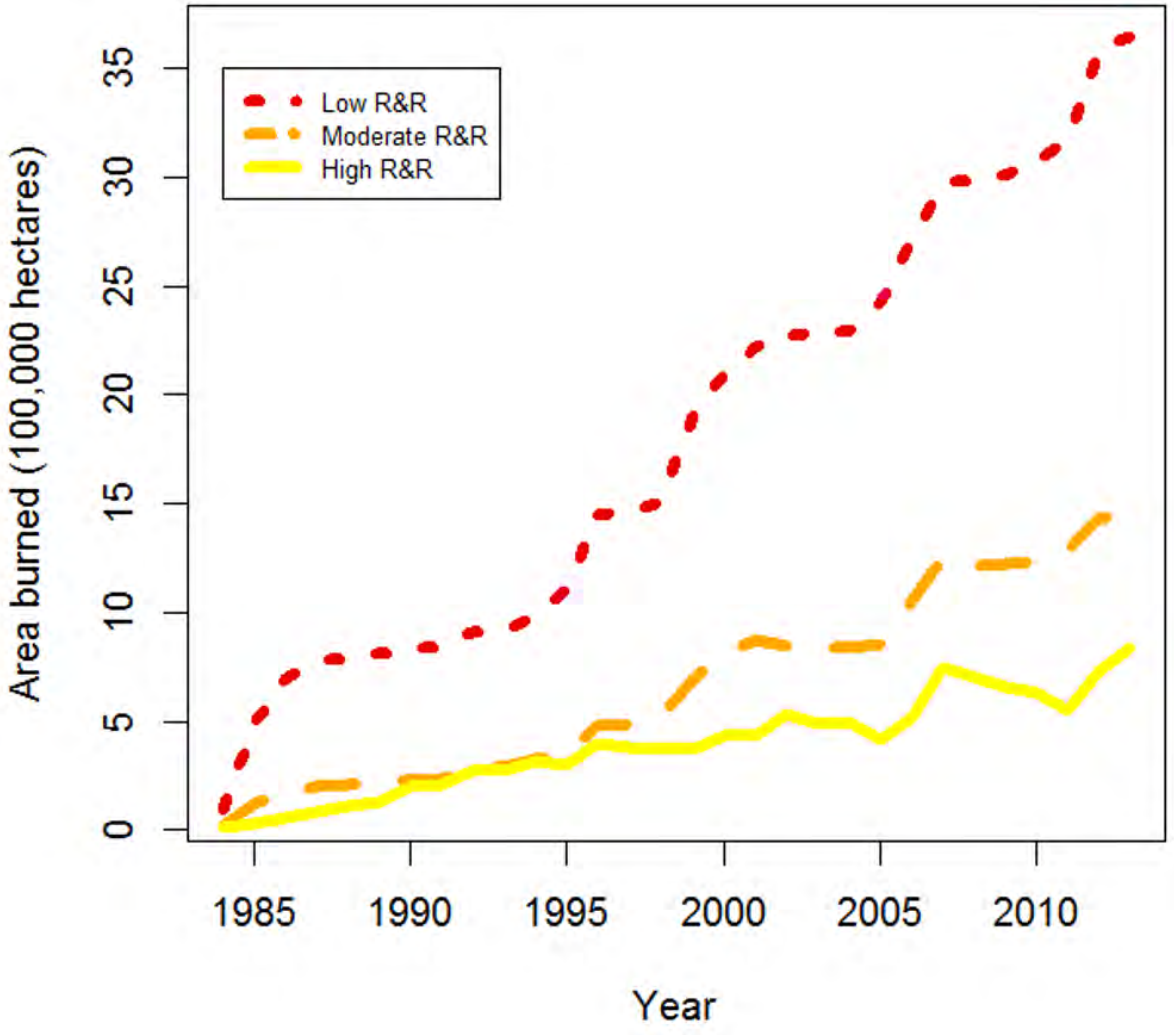

Figure 5. Increases in burned area (cumulative) by R&R index class across the Great Basin from 1984 to 2013.

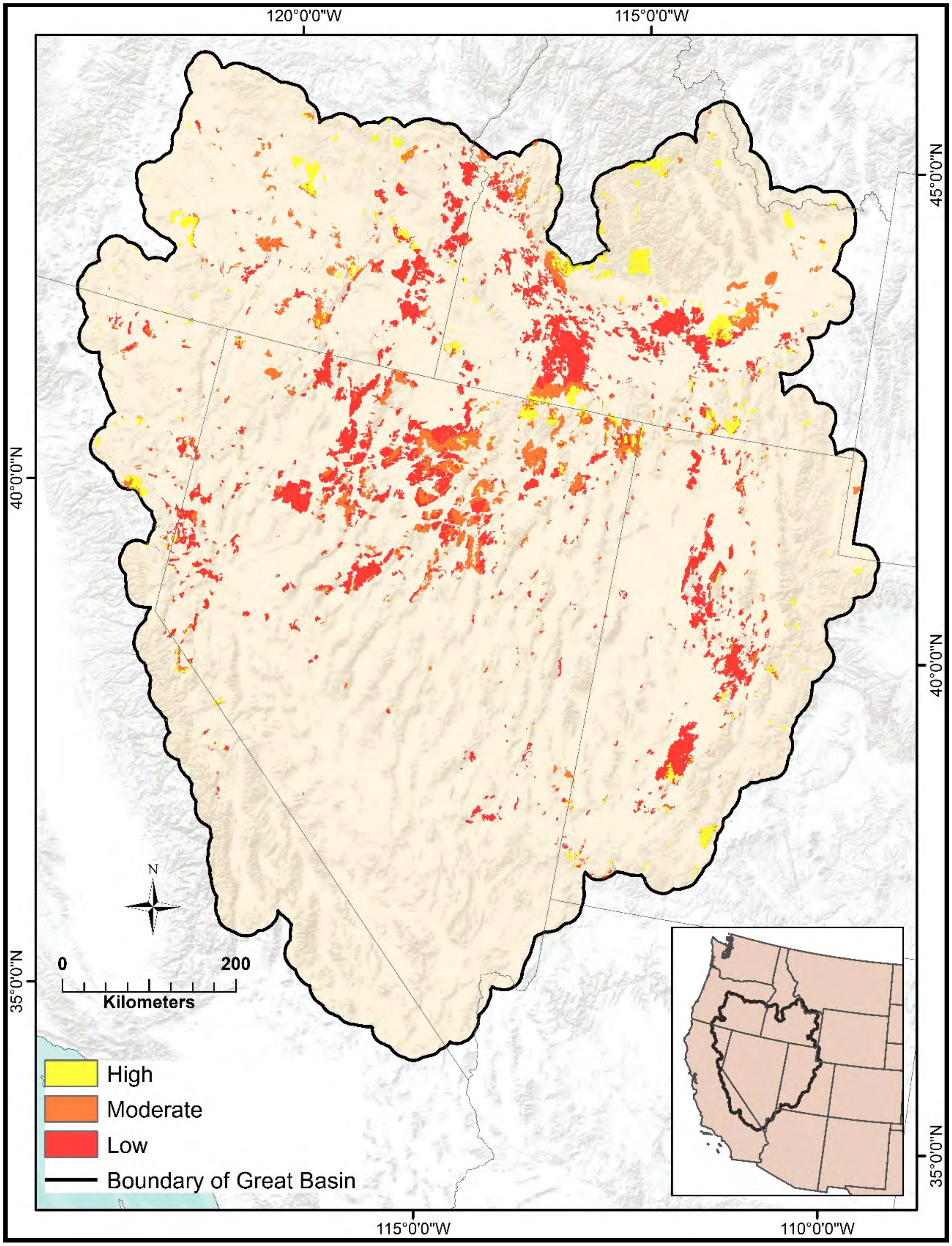

Figure 6. Map of cumulative burned area by R&R index class across the Great Basin as of 2013.

Table 5. Descriptive statistics for number of leks counted per state, male lek attendance, corresponding number of estimates of annual population rate of change (λ) used as response variables in Bayesian modeling of wildfire, precipitation, and density effects on sage-grouse in the Great Basin from 1985 to 2013.

State	Number of leks	Number of males per lek				Samples (estimated *r*) per lek				
		Average	SD	Min	Max	Average	SD	Min	Max	Total
Idaho	695	14.4	13.5	0.2	83.7	8.5	7.4	1	29	5,909
Nevada	540	16.5	14.2	0.5	94.9	6.3	6.4	1	29	3,413
Oregon	288	15.7	15.6	0.4	96.1	9.5	7.8	1	29	2,738
Utah	166	16.4	15.7	0.3	106.2	10.8	8.2	1	29	1,797
California	81	22.0	27.2	1.6	135.7	12.1	9.7	1	29	977
All States	1,770	15.8	15.3	0.2	135.7	8.4	7.5	1	29	14,834

Table 6. Ranking and selection of models formulated to identify the best combination of wildfire, precipitation, and density predictor variables influencing 30-year patterns of sage-grouse population growth across the Great Basin based on change in Deviance Information Criterion (ΔDIC).

[$\Delta \mathrm{DIC}_{\mathrm{Group}}$ is defined as DIC minus the minimum DIC value within the same group or subgroup, and is used to compare models within each group or subgroup; $\Delta \mathrm{DIC}_{\mathrm{DD}}$ is defined as DIC minus the DIC of the lagged-Gompertz-only model, and is used to compare each model to the Gompertz (one year lag) density-dependent model; $\Delta \mathrm{DIC}_{\mathrm{null}}$ is defined as DIC minus the DIC of the random-effects only model]

Step	Group	Subgroup	Model	DIC	$\Delta \mathrm{DIC}_{\mathrm{Group}}$	$\Delta \mathrm{DIC}_{\mathrm{DD}}$	$\Delta \mathrm{DIC}_{\mathrm{null}}$
1	Density-dependence	NA	Gompertz (one year lag)	56469.64	0.00	0.00	-63.81
			Null	56533.45	63.81	63.81	0.00
	Wildfire	Distance	Distance	56461.19	0.00	-8.45	-72.26
		Area	Chronic area, normal, 5 km	56462.79	0.00	-6.85	-70.66
			Chronic area, accelerated, 5km	56463.24	0.45	-6.40	-70.21
			Chronic area, normal, 10 km	56463.33	0.54	-6.31	-70.12
			Chronic area, accelerated, 10 km	56464.92	2.13	-4.72	-68.53
			Chronic area, decelerated, 5 km	56464.98	2.19	-4.66	-68.47
			Chronic area, decelerated, 10 km	56465.99	3.20	-3.65	-67.46
			Acute area, 5 km	56472.51	9.72	2.87	-60.94
			Acute area, 10 km	56473.57	10.78	3.93	-59.88
		Edge	Chronic perimeter:area, decelerated, 10 km	56469.78	0.00	0.14	-63.67
			Chronic perimeter:area, decelerated, 5 km	56470.95	1.17	1.31	-62.50
			Chronic perimeter:area, accelerated, 10 km	56471.58	1.80	1.94	-61.87
			Chronic perimeter:area, normal, 10 km	56472.28	2.50	2.64	-61.17
			Acute perimeter:area, 10 km	56472.76	2.98	3.12	-60.69
			Chronic perimeter:area, accelerated, 5 km	56473.43	3.65	3.79	-60.02
			Chronic perimeter:area, normal, 5 km	56473.67	3.89	4.03	-59.78
			Acute perimeter: area, 5 km	56473.83	4.05	4.19	-59.62

Step	Group	Subgroup	Model	DIC	ΔDIC_{Group}	ΔDIC_{DD}	ΔDIC_{null}
	Precipitation	NA	Spr-Sum-Fall, 10 km	56467.06	0.00	-2.58	-66.39
			Spr-Sum, 10 km	56468.81	1.75	-0.83	-64.64
			Sum, 5 km	56468.84	1.78	-0.80	-64.61
			Annual, 1 km	56468.93	1.87	-0.71	-64.52
			Spr-Sum-Fall, 5 km	56469.11	2.05	-0.53	-64.34
			Sum, 10 km	56469.12	2.06	-0.52	-64.33
			Fall, 10 km	56469.30	2.24	-0.34	-64.15
			Spr, 10 km	56469.91	2.85	0.27	-63.54
			Win-Spr-Sum, 10 km	56470.04	2.98	0.40	-63.41
			Spr-Sum, 5 km	56470.73	3.67	1.09	-62.72
			Annual, 5 km	56470.79	3.73	1.15	-62.66
			Spr, 5 km	56471.30	4.24	1.66	-62.15
			Fall, 5 km	56471.92	4.86	2.28	-61.53
			Win-Spr-Sum, 5 km	56472.02	4.96	2.38	-61.43
			Win, 10 km	56472.75	5.69	3.11	-60.70
			Win, 5 km	56473.42	6.36	3.78	-60.03
2	Combined (Interaction)	NA	Acute distance + Chronic area, 5 km * Spr-Sum-Fall, 10 km + Gompertz (1-year lag)	56457.16	0.00	NA	NA
	Combined (Additive)	NA	Acute distance + Chronic area, 5 km + Gompertz (1-year lag)	56458.59	1.43	NA	NA
			Acute distance + Chronic area, 5 km + Spr-Sum-Fall, 10 km + Gompertz (1-year lag)	56458.90	1.74	NA	NA

Competing evidence ($\Delta\text{DIC}_{\text{group}} < 2.0$) existed for chronic area with normal and accelerated recovery rate within 10 and 5 km of a lek, respectively, but we only carried forward the single best model to limit complexity of step 2. Notably, all models of acute burned area had a poorer DIC than the lag-Gompertz only model ($\Delta\text{DIC}_{\text{DD}} > 0.0$). Within the burned edge subgroup, no models were supported by the data better than the lag-Gompertz only model. Hence, no PA ratio covariates were carried forward to step 2. Finally, within the precipitation group, the model with precipitation within 10 km of a lek during spring, summer, and fall had the lowest DIC, and improved significantly on the lag-Gompertz only model ($\Delta\text{DIC}_{\text{DD}} < -2$), and this covariate was carried forward to step 2. No other precipitation group models satisfied the rule of $\Delta\text{DIC}_{\text{DD}} < -2.0$, so no other precipitation covariates were carried forward. Convergence criteria was met for all models (R-*hat* < 1.1).

For step 2, main effects models containing additive effects of density-dependence, wildfire, and precipitation explained less variation in λ compared to the model containing interaction effects between wildfire and precipitation (table 6). The equation for the final model including all carried-forward variables took the form:

$$\log(\lambda_t) = \beta_0 + \beta_{\text{DD}} \log(N_{t-1}) + \beta_{\text{FDist}} X_{\text{FDist}} + \beta_{\text{FArea}} X_{\text{FArea}} + \beta_{\text{Precip}} X_{\text{Precip}} + \beta_{\text{Interaction}} X_{\text{FArea}} X_{\text{Precip}} + \zeta_{\text{Lek}} + \zeta_{\text{Year}} \qquad (4)$$

where βs represent coefficients for intercept (0), lag-Gompertz density-dependence (DD), distance to perimeter burned (FDist), cumulative burned area (FArea), and seasonal precipitation (Precip; spring through fall), ζs represent random effects for lek and year. Descriptions are provided in table 3. Fit of the final model was excellent (Bayesian $P = 0.496$), and indicated that effects of wildfire varied inconsistently across the range of precipitation while accounting for density-dependence. Posterior probability distributions of the parameters for wildfire effects indicated that variation in population rate of change was positively related to distance away from the burned perimeter and negatively related to cumulative burned area with normal recovery rate within 5 km of a lek. On average, rate of change increased by approximately 1.1 percent (posterior median = 0.011, 95-percent CI = 0.007–0.015) with every 10 km increase in distance to burned perimeter (fig. 7), and decreased by 2.1 percent (0.021, 95-percent CI = 0.012–0.031) with every 10 km^2 increase in cumulative burned area (fig. 8). Interactive effects between cumulative wildfire and total precipitation during spring, summer, and fall indicated intriguing and complex patterns (fig. 9). Increasing precipitation correlated with increasing population size, whereby λ was predicted to exceed 1.0 during years of above-average precipitation if cumulative burned area was not too large. However, the positive effect of precipitation on population growth decreased as cumulative burned area increased, whereby λ was predicted to be below 1.0 during years with high precipitation at leks associated with relatively large amounts of cumulative burned area.

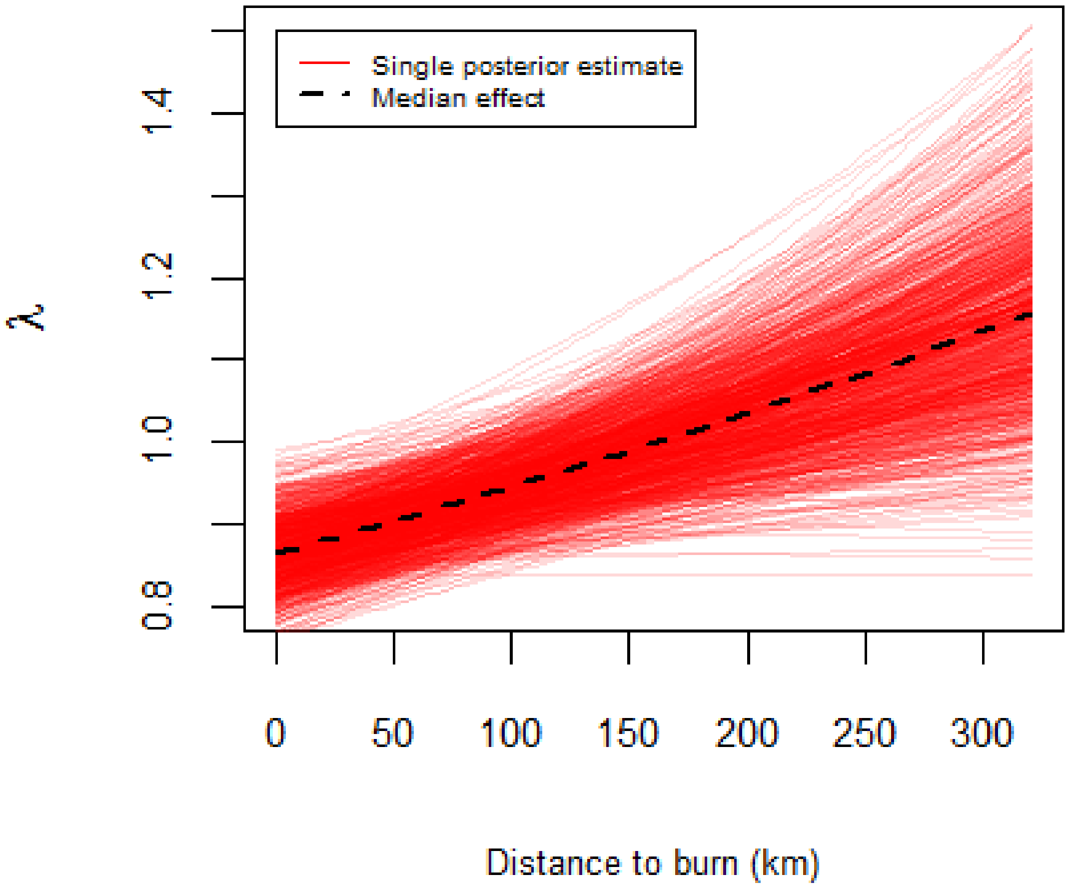

Figure 7. Effect of distance to burn perimeter on the annual population rate of change (λ) of sage-grouse across the Great Basin from 1985 to 2014. Ten thousand samples from the posterior distributions of model parameters were used to represent the range of uncertainty in this relationship.

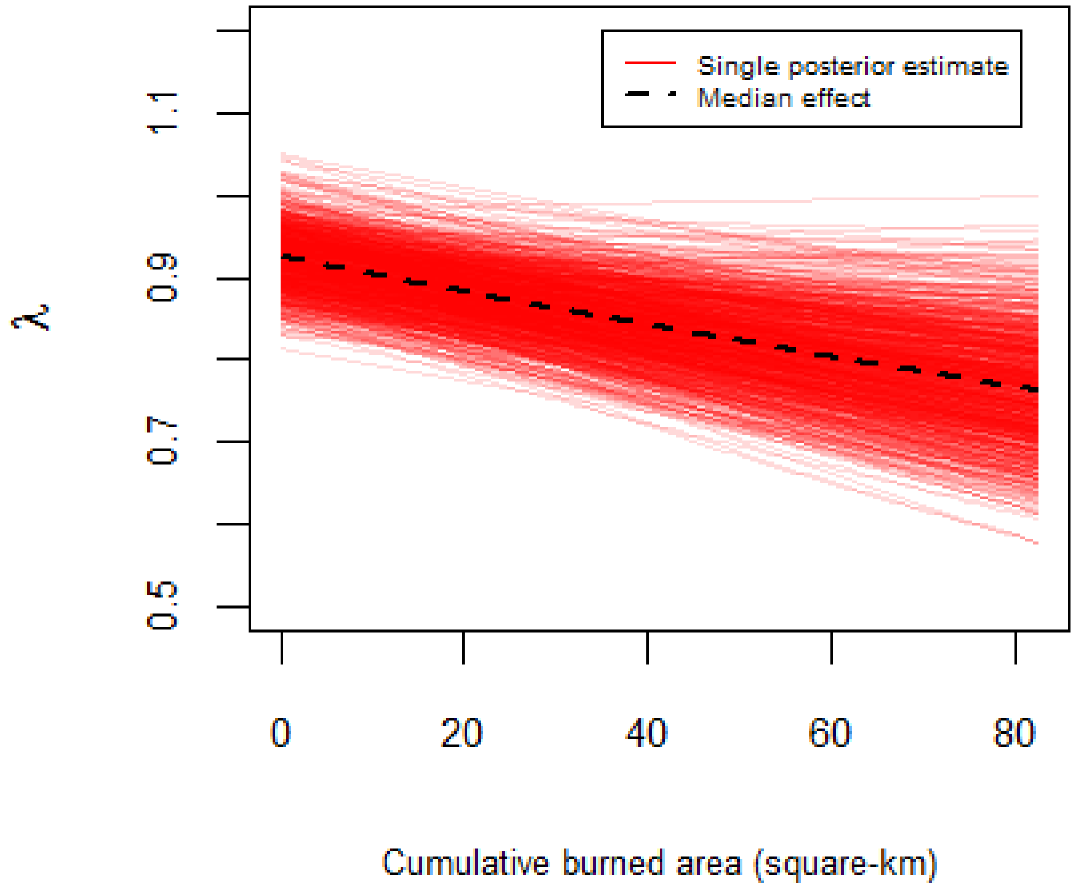

Figure 8. Effect of cumulative burned area (square-km) on the annual population rate of change (λ) of sage-grouse across the Great Basin from 1985 to 2014. Ten thousand samples from the posterior distributions of model parameters were used to represent the range of uncertainty in this relationship.

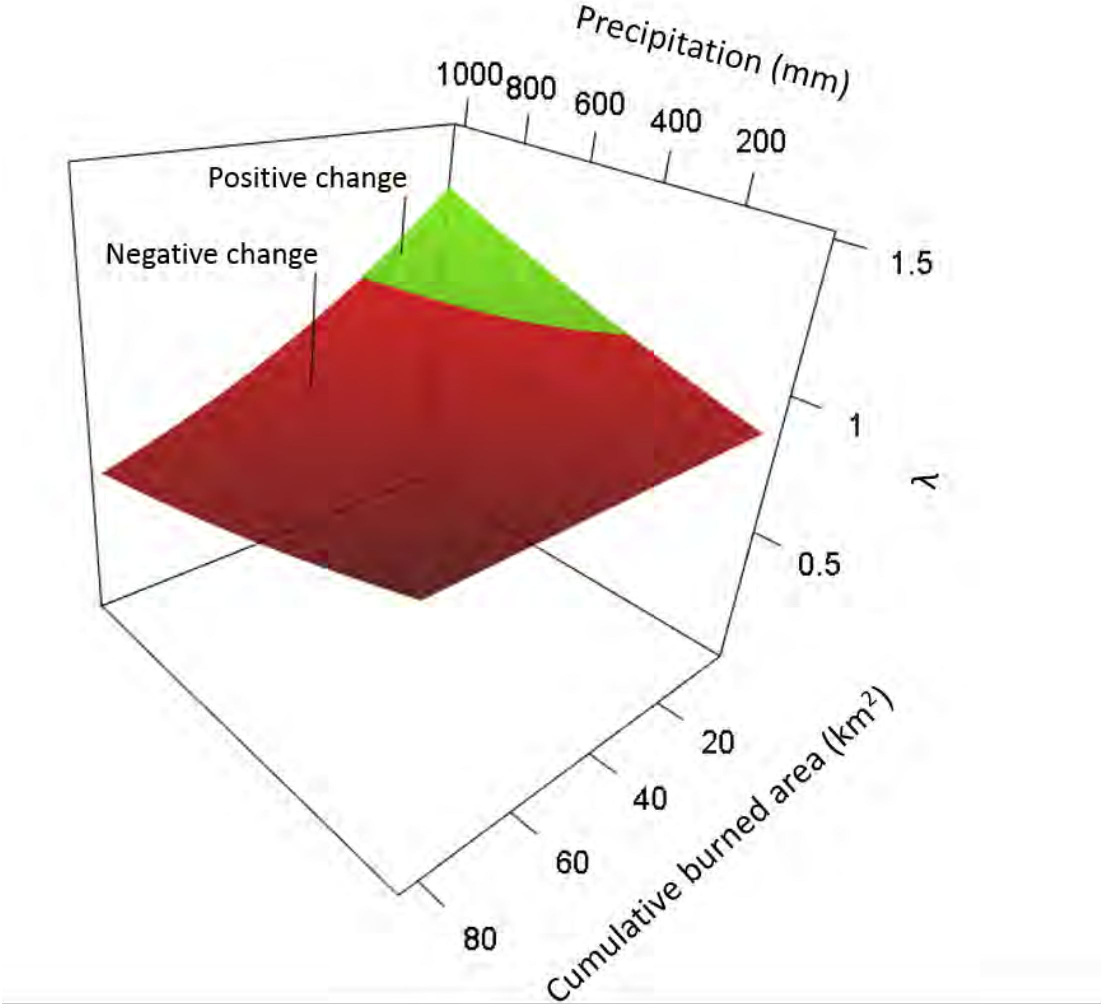

Figure 9. Three-dimensional display of the interaction effects between precipitation (spring through fall) and cumulative burned area on population rate of change (λ) of sage-grouse in the Great Basin from 1985 to 2014.

Patterns of Cumulative Burned Area and Recovery Near Leks

Based on results from the burned area subgroup test in step 1 above, we modeled cumulative burned area per year within 5 km of leks using the normal burn recovery rate to describe past and predict future changes in the amount of burned areas, which explained more variation than the null model (ΔDIC = 6.85) and adequately converged (R-*hat* $\leq$ 1.1). The inter-annual trend estimate (median value of posterior probability distribution) indicated that 3.4 km^2 (0.4 percent) per lek burned annually when averaged across all three R&R classes (fig. 10). When expressed as cumulative averages for the burned proportional area within 5 km of a lek for each resilience and resistance index classes: high R&R burned at 0.36 percent per year (95-percent CI = 0.0034–0.0039), moderate R&R burned at 0.34 percent per year (95-percent CI = 0.0031–0.0037 percent), and low R&R burned at 0.53 percent (95-percent CI = 0.0050–0.0056; fig. 10). By 2013, an average of 89.1, 89.7, and 84.2 percent of unburned area with high, moderate, and low R&R, respectively, remained within 5 km of a lek.

30-Year Predictions of Cumulative Burned Area and Sage-Grouse Population Persistence

We estimated future cumulative burned area based on normal recovery rate for each R&R class by extracting 30,000 samples from the posterior probability distribution for area burn rate and extrapolating future cumulative burned area over 30 more years. By 2044, an average of 77.8, 79.1, and 67.8 percent of unburned area with high, moderate, and low R&R, respectively, was projected to remain within 5 km of a lek (fig. 10). We then took each sample of the posterior probability distribution for the projected cumulative burned area for each year, and multiplied it by the effect of cumulative burned area on annual population λ (derived from step 2) to project proportional changes in population size separately by R&R index class over the next 30 years. Because the effect of cumulative burned area was confounded by the interaction with precipitation, we generated projections under normal (50th percentile), below-average (25th percentile), and above-average (75th percentile) levels of precipitation from spring through fall. We assumed a stable population ($\lambda = 1.0$) at the start of projections in order to better mimic environmental conditions facing sage-grouse in the absence of wildfire. Starting population size for projections was based on the mean of the 2014 lek counts within each R&R class, and subsequent annual changes in population size were expressed as a proportion of the population in 2014.

Sage-grouse populations under normal precipitation conditions declined steadily, resulting in 48, 52, and 30 percent of grouse in high, moderate, and low R&R leks, respectively, projected to remain by 2044 according to the 50th percentile parameter (median) of the posterior probability distribution (fig. 11A). Sage-grouse populations declined more sharply under below-average precipitation conditions, for which 36, 38, and 22 percent of grouse in high, moderate, and low R&R leks, respectively, were projected to remain by 2044 on a median basis (fig. 11B). In contrast, sage-grouse populations in high and moderate R&R leks remained stable under above-average precipitation conditions through approximately 2025 on a median basis, and some upper percentile distributions showed some population growth. However, high and moderate R&R leks began to decline after 2025, and only 67 and 71 percent, respectively, remained by 2044. Population decline was invariant to higher precipitation for low R&R leks, and only 40 percent remained by 2044 (fig. 11C).

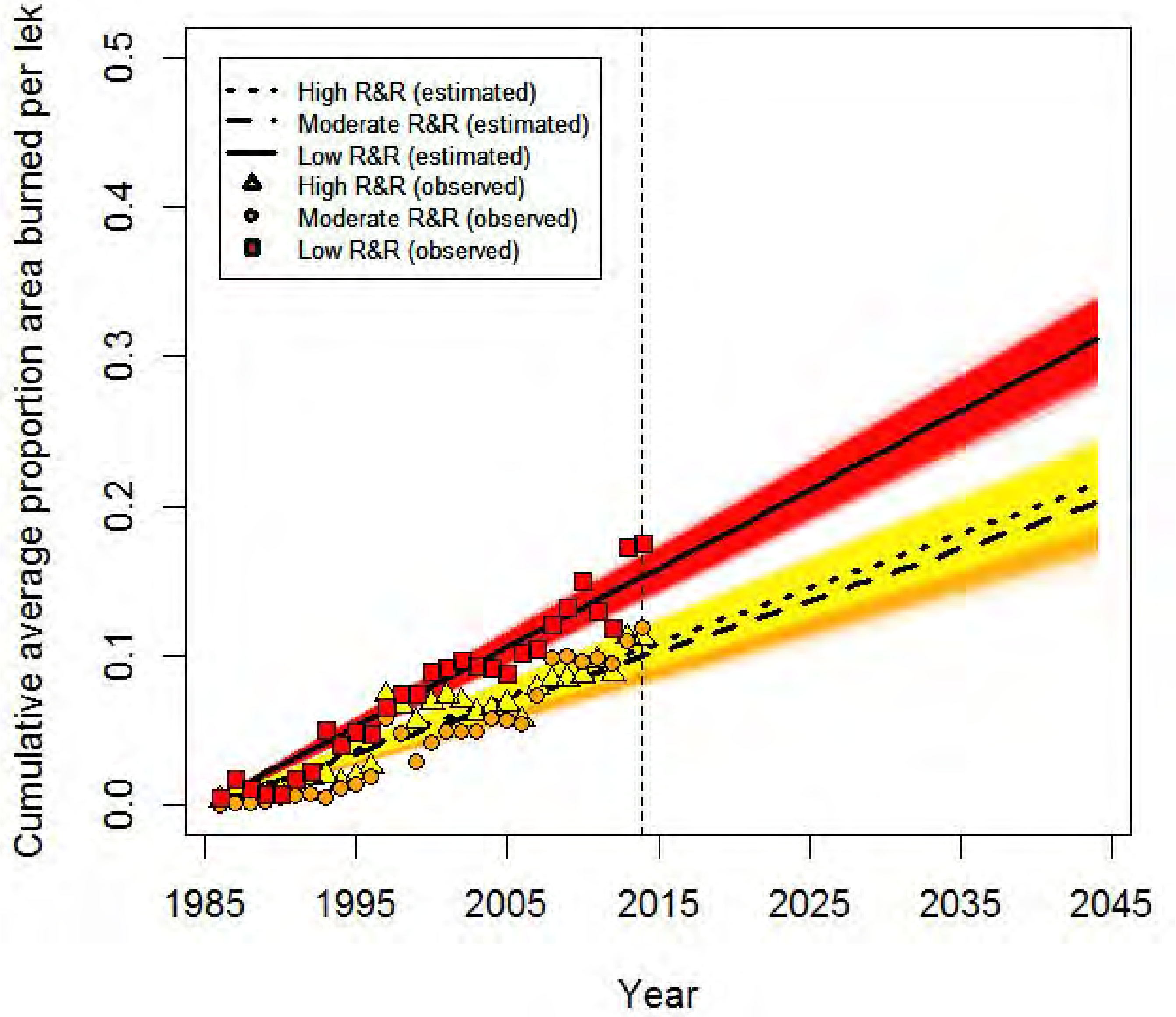

Figure 10. Observed and predicted changes in cumulative burned area over time by R&R class. Y-axis values represent the average proportion of a 5 km circular lek buffer.

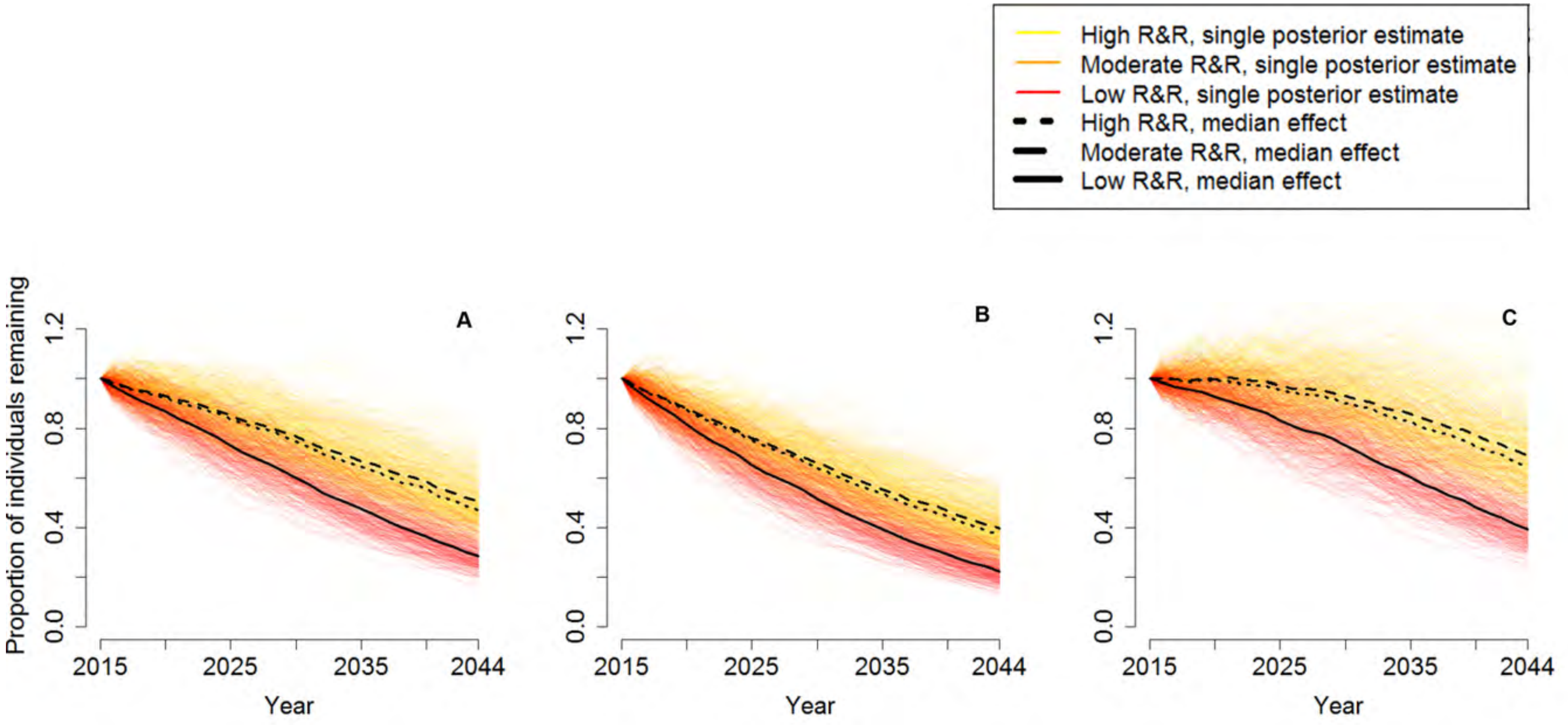

Figure 11. Thirty year predictions for proportion of sage-grouse populations remaining in the Great Basin given modeled effects of cumulative fire on rates of change under projected median (50th percentile; A), low (25th percentile; B), and high (75th percentile; C) amounts of precipitation during spring, summer, and fall.

Management Scenarios

Slowing forecasted population declines of Great Basin sage-grouse over the next 30 years may depend on intensity of fire suppression efforts in population ‘core areas’ and long-term patterns of precipitation (fig. 12). On a median basis, based on our simulations, reducing the rate of annual cumulative burned area by 25 percent in defined ‘core areas’ under all three modeled precipitation conditions did little to prevent population declines, and trajectories tracked those outside core areas where models allowed wildfires to continue to burn at the original modeled rate. However, reducing the cumulative burned area by 75 percent substantially slowed the rate of population decline under below-average precipitation conditions, stabilized population growth under normal precipitation conditions, and resulted in population growth under above-average precipitation conditions. Near complete fire suppression (99 percent) in core areas resulted in slightly increased population growth under all precipitation conditions on a median basis, especially for normal and above-average precipitation.

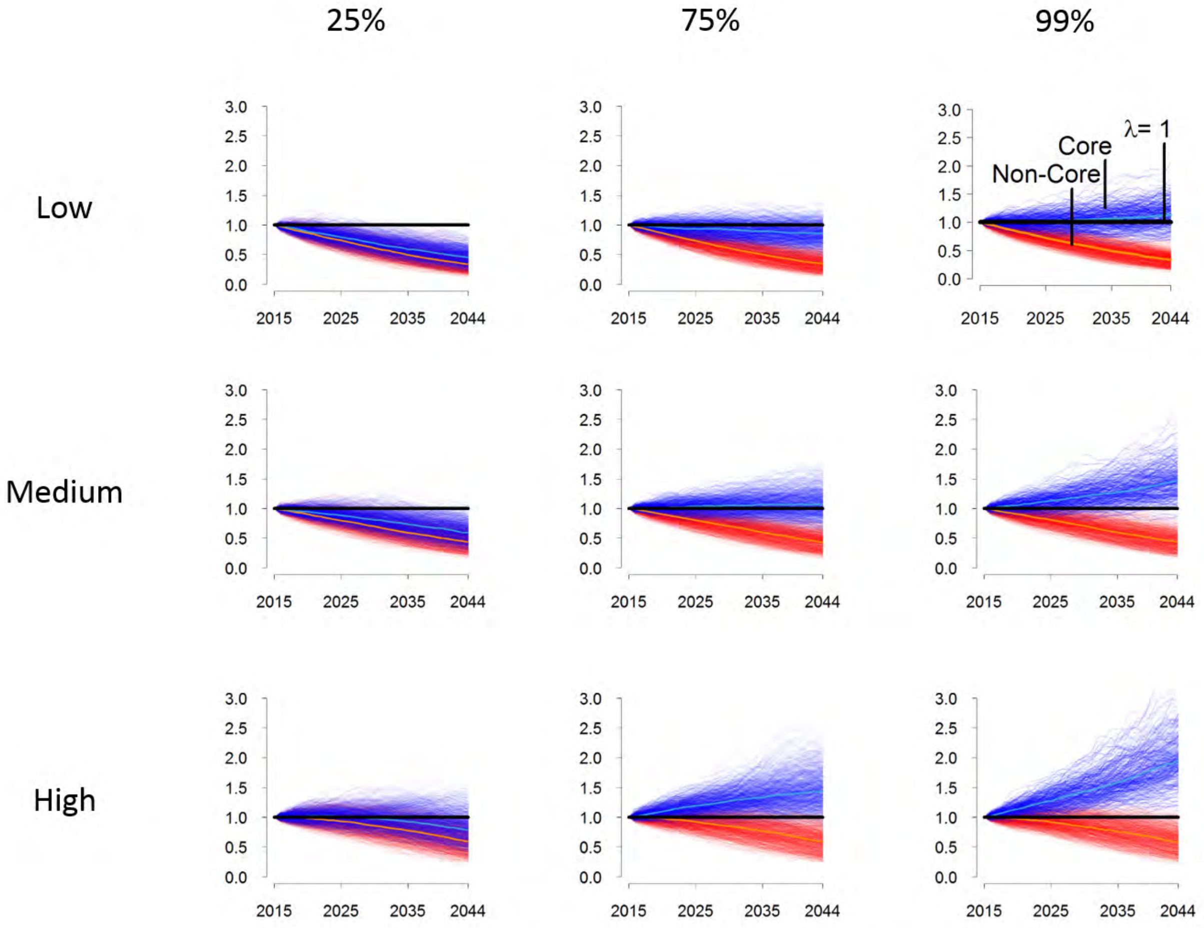

Figure 12. Examples illustrating projected sage-grouse population rate of change (λ) over the next 30 years under example management scenarios of 25, 75, and 99 percent reductions in annual average cumulative burned area within 5 km of lek sites under low, median, and high amounts of precipitation. Solid black line indicates stable population growth (λ = 1.0).

Interpretation and Conclusions

We quantified relatively long-term effects of wildfire and precipitation on sage-grouse population growth across the Great Basin, a significant proportion of the species range. Our results indicate that wildfire has persistently and negatively impacted sage-grouse population growth over the past three decades. Although wildfire is a natural process in sagebrush ecosystems, burn frequency and size of wildfires within the boundaries of the hydrographic Great Basin have increased artificially over the past few decades in response to the range expansion of invasive annual grasses (that is, primarily cheatgrass native to Eurasia) and changes in land-management practices (Baker, 2006, 2011; Brooks and others, 2015; Ielmini and others, 2015). However, trends in burn frequency, wildfire size, and other attributes have been shown to vary substantially across the range of sage-grouse (Brooks and others, 2015). Within the Great Basin, wildfire is highly probable when cover of annual grass increases to values greater than 45 percent (Link and others, 2006; cited by Miller and others, 2011), and a large majority of sagebrush ecosystems within the Great Basin are at high risk of wildfire if cheatgrass expansion continues at its unfettered pace (Suring and others, 2005; cited by Miller and others, 2011). Importantly, evidence of the chronic effect suggests that the adverse impacts associated with wildfire on sage-grouse populations are primarily driven by replacement of sagebrush following fire to invasive grasses. These findings indicate that model-predicted increases in cumulative burned area (that is, wildfire-scars) over the next 30 years will have significant negative impacts on sage-grouse habitat and long-term sage-grouse population trajectory.

Given current rates of cumulative burned area within 5 km of leks, model-based projections indicate continued declines for sage-grouse in the Great Basin over the next three decades under most scenarios. Across all R&R classes within the Great Basin, we projected a median of 44 percent (95-percent confidence limit; 22 to 69 percent) of current sage-grouse population numbers will remain by the mid-2040s. Our projections are similar to those of another recent study conducted across the four sage-grouse management zones within the Great Basin, which projected a 50-percent reduction (range 32−60 percent) in carrying capacity (a surrogate for population size) by 2043 (Garton and others, 2015). These consensus findings were reached despite distinctly different methodologies between these studies. For example, our study employed Bayesian inferences derived from individual lek complexes modeled with density-dependence, wildfire, and precipitation covariates while implementing random effects to account for random variation among site and year. Because these environmental conditions (that is, wildfire and precipitation) often change over time and can demonstrate cyclical patterns (Fedy and Doherty, 2011), our modeling approach allowed for temporal variation in rate of change as a function of short-term changes in those environmental factors over the past 30 years. In other words, our population rate of change was not constrained to fit a linear time trend. However, our 30-year projections were based on predicted average annual changes in cumulative burned area over time (that is, linear change) under different precipitation scenarios. In contrast, Garton and others (2015) applied maximum likelihood estimates derived from larger regional clusters of leks modeled with density-dependence and temporal (that is, year) effects, instead of environmental covariates. Year effects also can serve as a proxy for environmental conditions that change over time. Thus, similar projections among studies, coupled with exceptional fit of our model, indicate that wildfire and precipitation patterns explain temporal patterns in sage-grouse population size in the Great Basin. Although estimation of growth rate is sensitive to variation in absolute population size relative to carrying capacity and cyclic dynamics (May, 1974), similar conclusions reached by both studies indicate that estimated effects are not spurious artifacts of a specific modeling technique.

Sage-grouse in the Great Basin essentially inhabit a cold desert where ecosystem productivity is tied strongly to water availability (Noy-Meir, 1973). It follows that periods of above-average precipitation result in food and cover resources that boost survival of young sage-grouse and contribute to population recruitment (Blomberg and others, 2012; Guttery and others, 2013). Precipitation supports moisture recharge of upland mesic sites where forbs and invertebrates become abundant as food for young grouse (Casazza and others, 2011). Thus, precipitation may provide a population-level buffer against subsequent periods of drought, where prolonged drought is likely to have deleterious impacts on population persistence, independent of wildfire. In our study, sage-grouse population growth responded positively to increases in total precipitation during spring, summer, and fall months, supporting grouse reproduction. However, this positive effect was counteracted as cumulative burned area in relation to leks increased across the Great Basin, and was nullified where burned areas were the largest. Blomberg and others (2012) found a similar pattern at a local study site located within central Nevada. Hence, wildfire acts to negate the positive effects of cyclically favorable weather on sage-grouse population growth and appears to do so across multiple spatial scales.

Our modeling approach has two informative and novel aspects. The first of which is our spatially explicit incorporation of different recovery times for sagebrush with range-wide concepts of resilience and resistance that are currently a cornerstone of sagebrush ecosystem management. Habitat in the low R&R comprises approximately 40 percent of all habitat with mapped R&R values in the Great Basin, and an ecosystem that is highly susceptible to cheatgrass invasion following disturbance. Accordingly, current R&R-based management strategies call for protecting intact low R&R habitat "of high conservation value" from wildfire, and enhancing R&R in moderate and high R&R habitats in the early stages of cheatgrass invasion where restoration success is high because, in part, of increasing cover of perennial grasses and forbs and reducing large-woody fuel loads such as encroaching pinyon-juniper (Chambers and others, 2014a, 2014b). Our model-simulated conversion of burned habitat with low R&R to a permanent burn-scar integrates the rather high likelihood of a hysteretic transition to a cheatgrass-invaded state without intensive (and sometimes ineffective) management intervention. It follows that wildfire had the most substantial impact on sage-grouse inhabiting these habitats where projected population declines were greatest.

However, these R&R based projections also predicted 30-year declines for sage-grouse inhabiting moderate and high R&R habitats. Although moderate and high R&R habitats may recover relatively quickly in ecological time and restoration of sagebrush ecosystems are thought to have a high likelihood of success (Chambers and others, 2014a, 2014b), our findings suggest that wildfires within these habitats still can be harmful to sage-grouse survival and recruitment, especially if wildfires increase in size and frequency. Hence, relatively fast ecosystem recovery times in moderate and high R&R habitats under the current burn trends in the Great Basin may be asynchronous with sage-grouse demographic response to post-wildfire recovery of sagebrush. Management of wildfire in sagebrush from a perspective of plant-soil dynamics and disturbance regimes can benefit from a greater understanding of sage-grouse demographic responses to wildfire provided by our modeling.

The second informative and novel aspect of our approach stems from our example management scenarios, which simulated focused reductions in cumulative burned area near leks within sage-grouse 'core areas' across the Great Basin. These areas are most meaningful to sage-grouse based on response indices of habitat suitability and abundance (Doherty and others, 2015). For example, high resolution maps depicting habitat suitability for sage-grouse have been developed recently in Nevada and northeast California (Coates and others, 2014). Core areas calculated in this Nevada and California region overlap with approximately 20 percent of overall sage-grouse habitat (48 percent of high quality) but encompass about 90 percent of the males counted. It follows that targeted fire suppression in these core areas could help conserve large blocks of the ‘best’ areas for sage-grouse in the Great Basin. A straightforward calculation between males counted per hectare within core versus non-core areas, revealed an approximate 32.8-fold increase (3,180 percent increase) in ‘return’ by focusing on core opposed to non-core areas, and a 4-fold increase (298 percent increase) in return compared to random area of sage-grouse. In our example scenarios, reducing cumulative burned area per year by 25 percent in core areas under current regimes of median precipitation slows, but does not halt, projected rates of overall sage-grouse decline based on the 50th percentile of the posterior distributions of model derived parameters. However, reducing this area by 75 percent in core area under the current median or below average precipitation regimes may result in locally stable sage-grouse populations.

Importantly, our analysis incorporated recovery times as a function of their corresponding R&R index values. Thus, reduction in cumulative burned area can be achieved through management actions aimed at fire suppression as well as those that accelerate sagebrush recovery. We recognize that federal wildfire managers have reported that 97 percent of fires burned less than 1,000 acres of area, which may have been the result of initial attack fire suppression activities, and less than 1 percent were greater than 10,000 acres (Havlina and others, 2015). Although additional modeling would help us achieve reliable estimates of suppression rates and, perhaps, understand relationships between fire suppression rates versus burned areas in the Great Basin, increased suppression could lead to a significant reduction in cumulative burned area if potentially large wildfires (that is, mega-wildfires) are suppressed before they grow to unmanageable sizes. Importantly, approximately 32 percent of the estimated sage-grouse population within core areas (based on the maximum of lek counts between 2009 and 2014) is comprised primarily of low R&R habitat within 5 km of leks. Because these sites are highly susceptible to invasive grass following wildfire and, thus, permanent loss of sagebrush, management actions focused on suppression and protection should be most effective. However, it follows that core area leks surrounded by moderate or high R&R may benefit from recovery actions, as well as suppression. This is important because sage-grouse core areas comprised 35 and 39 percent of high and moderate R&R classes, respectively. It is also important to recognize that the predicted ‘success’ of reducing cumulative burned area varies with amounts of precipitation. Although climate models predict future increases in winter precipitation in latitudes above 40°, the Great Basin as a whole is predicted to receive lower precipitation in upcoming years (Intergovernmental Panel on Climate Change, 2014; Schlaepfer and others, 2014). Thus, predicted outcomes of increasing sage-grouse populations with reductions of cumulative wildfire in core areas under high precipitation conditions will likely be most effective in northern areas where R&R is relatively high and conditions generally are colder and wetter. However, reductions may be less effective in more southern areas of the Great Basin if climate model predictions hold.

Several caveats need to be considered when interpreting or implementing our results. First, recovery times specific to R&R classes did not take implemented restoration efforts into account (for example, Emergency Stabilization and Rehabilitation; Pilliod and Welty, 2013). However, restoration success is highly variable (Arkle and others, 2014), and often dependent on local conditions (for example, wet sites with established perennial grasses) or intensity of restoration (for example, drill seeding) (Knutson and others, 2014). Thus, modeling restoration efficacy and success was beyond the scope of our Great Basin-wide analysis of wildfire effects on sage-grouse, but may contribute to additional variation in sage-grouse demographic response to wildfire. Similarly, post-wildfire recovery times for sagebrush can vary widely along elevation and precipitation gradients across the species’ range. For example, Baker (2011) estimated that post-fire recovery times in mountain big sagebrush communities can take either fast (25–35 years) or slow (75–100 years) tracks for recovery. In contrast, recovery in arid Wyoming big sagebrush communities can be more prolonged (for example, 50–120 years, Baker, 2006). The temporal duration of our time series (that is, 30 years) precluded testing of different recovery times to complete pre-wildfire conditions, so we focused on recovery times for minimal resources necessary (that is, 20 percent sagebrush return) to meet some sage-grouse life history requirements based on published estimates. Notably, our slower 'decelerated' recovery model showed less support from the data than the 'normal' recovery model. Collection of field-data to quantify a chronological sequence of wildfire-related vegetation change or recovery among R&R index classes could prove beneficial to these and other analyses, and is currently underway.

The second caveat is that our analysis did not parse the effects of prescribed fire versus wildfire, or potential beneficial effects of fire in sagebrush ecosystems. As stated previously in this report, most studies of fire effects on sage-grouse and their habitat have focused on prescribed fire. Connelly and others (2000a) described a significant decline in lek attendance following a prescribed fire that removed nearly 60 percent of existing sagebrush, while other studies have reported prescribed fire-related reductions in forage availability and quality (Nelle and others, 2000; Rhodes and others, 2010). However, low intensity prescribed fire followed by higher-than-normal annual precipitation has been associated with increased flowering and extended phenology of several forb taxa selected by sage-grouse and their chicks (Wrobleski and Kauffman, 2003). In addition, approximately 66 percent of sage-grouse leks tend to occur in sagebrush habitats with low to moderate R&R that are being subjected to larger and more persistent wildfire scars according to our models. Yet, this pattern may not pertain to montane habitats at high elevation that our model did not specifically measure (Brooks and others, 2015), as well as other areas outside the Great Basin but within the range of sage-grouse with a preponderance of high R&R habitats (for example, sage-grouse management zones I and II). Historical wildfire may have been beneficial in these wet and productive montane habitats where resilience is intrinsically high (Brooks and others, 2015). Suppression of wildfire at higher elevations also may have the unintended consequence of facilitating encroachment of pinyon-juniper woodlands across the Intermountain West (Miller and Rose, 1999; Miller and others, 2013), which decreases resilience to wildfire (Chambers and others, 2014a) and substantially reduces sage-grouse habitat suitability (Casazza and others, 2011; Baruch-Mordo and others, 2013).

Finally, several aspects of our empirical modeling and future projections incorporated 'best case' assumptions that require additional discussion of caveats. First, our 30-year projections began with stable populations ($\lambda = 1.0$) without explicit incorporation of modeled density-dependent or climatic parameter estimates. Rather, and for the sake of focusing on the primary question of interest (that is, fire), we drew from posterior distributions of parameter estimates for the effect of burned area that accounted for variation in density and precipitation. Second, we modeled and projected increases in cumulative burned area as a linear function with time (year). Notably, empirical data points for burned area near the end of the time-series fell outside the upper tail of the 95-percent prediction interval (fig. 10), which appears to take an exponential form. We chose to conservatively model a linear relationship owing to uncertainty in future rates of fire suppression and restoration efficacy.

A third point that likely led to more optimistic predictions was our estimation of post-fire recovery rates for R&R index classes based on meta-analyses for mountain and Wyoming big sagebrush communities, where we assumed mountain big sagebrush comprised high and moderate R&R, and Wyoming big sagebrush comprised low R&R. Recovery for leks classified as high and moderate R&R could be biased high if they also comprised some proportion of Wyoming big sagebrush. Moreover, our 'recovered' criteria of 20 percent return of pre-fire sagebrush cover only meets partial life history requirements, and may be too low to maintain adequate sage-grouse survival or recruitment. High sagebrush cover is not always associated with winter and brood rearing habitat, but large expanses of intact sagebrush often associates with high nesting success, and tall sagebrush is critical for providing forage in deep snow conditions (Connelly and others, 2000b; P. Coates and M. Casazza, U.S. Geological Survey, unpub. data, 2008).

We additionally defined burned area based on MTBS severity classes most indicative of vegetation change resulting from fire (that is, severity class ≥ 2), yet MTBS severity classes are prone to errors of omission and commission. A recent analysis of MTBS fires within big sagebrush, black and low sagebrush, and grassland vegetation types across the range of the sage-grouse indicated that 70 percent of fires were classified using "initial assessment" imagery from the same growing season as the fire (typically a few months later) and the other 30 percent used "extended assessment" imagery from the first growing season after the fire (Brooks and others, 2015). In areas where the latter imagery is used, vegetation recovery prior to the imagery acquisition in the following growing season can result in lower dNBR values than if initial assessment imagery were used. Among all the 30-m MTBS pixels within the fires evaluated in Brooks and others (2015), initial assessment fires contained 13 percent fire-severity class 1 pixels, whereas extended assessment fires contained 35 percent fire-severity class 1 pixels. We do not know the specific proportions of initial versus extended assessment fires, and thus a potential underestimation of fire area is possible using the fires in this current study. However, by focusing on MTBS fires (that is, greater than 405 ha), we likely omitted approximately 5 percent of the total fire area that would have otherwise been represented by smaller fires (Eidenshink and others, 2007; Brooks and others, 2015). Thus, the absolute fire area values reported in the current study should be considered conservative underestimates. Departure from these 'best case' aforementioned assumptions or realization of caveats would likely lead to more rapid projected population declines and accentuated negative effects on sage-grouse.

Using large-scale datasets and well-founded R&R concepts, our study identifies clear and predictable patterns of major sagebrush habitat loss associated with cumulative wildfire effects. R&R concepts, which has often resulted in major losses of sagebrush habitat. Importantly, even under 'best case' assumptions, we demonstrate that adverse impacts associated with accelerating positive feedbacks between wildfire and invasive annual grass on sage-grouse populations are non-trivial in the Great Basin and, under some conditions, wildfire can nullify positive effects on sage-grouse that are normally associated with increased precipitation. Balancing management resources between post-wildfire restoration actions versus those of fire suppression is a challenging task facing land and wildlife agencies. Dependent on sagebrush ecosystem concepts and population responses of sage-grouse, our work provides an initial modeling framework and decision support tool to help land and wildlife managers sustain sage-grouse populations within the Great Basin.

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AN INTEGRATED RANGELAND FIRE MANAGEMENT STRATEGY

Final Report to the Secretary of the Interior

May 2015

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March 3, 1849

THE DEPUTY SECRETARY OF THE INTERIOR
WASHINGTON

MAY 19 2015

Memorandum

To: Secretary

From: Deputy Secretary

Subject: SO 3336 – The Final Report: *An Integrated Rangeland Fire Management Strategy*

Secretary Order 3336, *Rangeland Fire Prevention, Management and Restoration* (Order), established a Rangeland Fire Task Force (Task Force) with the charge to present a final report no later than May 1, 2015. As Chair of the Task Force, I am pleased to present for your review our report, entitled, "*SO 3336 - The Final Report: An Integrated Rangeland Fire Management Strategy.*"

The Strategy outlines activities for implementation prior to both the 2015 and 2016 Western fire seasons. It also outlines longer-term actions to implement the policy and strategy set forth in the Order, including the continued implementation of approved actions associated with the Strategy.

On behalf of the Task Force, I recommend you accept and approve these actions and direct the entities identified as the Responsible Parties for each action proceed with implementation.

Concur:

Sally Jewell
Sally Jewell

MAY 19 2015
Date

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Dear Reader,

A draft version of this report entitled, Draft Report, *A Set of Longer-Term Actions and Activities*, was available for public comment on April 2, 2015. As part of the outreach in developing this Strategy, the Department of the Interior held government-to-government tribal consultations and additional outreach to other stakeholders and partners. The actions identified in the Final Report, *An Integrated Rangeland Fire Management Strategy,* incorporates comments received from a wide range of stakeholders and partners and from the tribal consultation meetings. In an effort to enhance the coordination between related activities, reduce overlap, and efficiently utilize federal and other resources, some of the proposed actions in the April 2, 2015 Draft Report were consolidated, moved, or otherwise revised. As a result, the actions identified in the Final Report may differ from those identified in the April 2, 2015 Draft Report.

Sincerely,

The Rangeland Fire Task Force

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Table of Contents

FUNDAMENTAL PRINCIPLES

Promote "All Hands, All Lands" Management

Employ a Risk-Based Approach

Improve Application of Science and Technology

Monitor and Adapt for Success

An Integrated Rangeland Fire Management Strategy (the Strategy) is intended to improve the efficiency and efficacy of actions to address rangeland fire, to better prevent and suppress rangeland fire, and improve efforts to restore fire-impacted landscapes. These activities involve targeted investments to enhance efforts to manage rangeland fire in specific portions of the Great Basin region, consistent with efforts of tribal, state, and other lands, and in keeping with the trust responsibilities to Indian tribes and other statutory obligations.

Essential to the success of the Strategy is improving efforts to work on a landscape-level and better employing science and technology to target areas of high priority for preventing, suppressing, and restoring fire-impacted landscapes using a risk-based approach. Through application of "All Hands, All Lands" management, increased collaboration among Federal, state, tribal, and local officials, natural resource managers, and the fire community can improve the efficiency and effectiveness of the overall rangeland fire management effort. A commitment to monitoring changes in resource conditions to evaluate the effectiveness of different management strategies will improve learning and, through adaptive management, increase the success of the Strategy.

Better managing rangeland vegetation and reversing the spread of invasive, non-native grasses, such as cheatgrass, is critical to breaking the invasive species-fire cycle that has contributed to the increased frequency and intensity of rangeland fires. By planning projects at a landscape scale to reduce and control invasive species and rapidly restore lands impacted by fire to native vegetation, progress in protecting and restoring the iconic sagebrush-steppe ecosystem for the benefit of all can be achieved.

Introduction

The Department of the Interior (DOI) manages millions acres of public land across the United States. These lands – and the many resources and services they provide – are for the benefit of current and future generations. The protection and recovery of imperiled species of plants and animals and the ecosystems upon which they depend is one of DOI's management objectives across these lands.

In the Great Basin region – including portions of the states of Oregon, Idaho, Utah, Nevada, and California – a significant portion of the landscape administered by the Bureau of Land Management (BLM) is comprised of the sagebrush-steppe ecosystem. This ecosystem is one of the most imperiled in the United States.[1] The accelerated invasion of non-native annual grasses—in particular cheatgrass and medusahead rye—and the spread of pinyon-juniper into the sagebrush-steppe ecosystem, coupled with the effects of intensified drought and climate change, are creating conditions that are leading to larger, more intense rangeland fires across the Great Basin.

Cheatgrass (*Bromus tectorum*) is of particular concern. It is one of the most aggressive, non-native species that thrives in areas disturbed by wildfire and other land-use activities, and can dominate large areas across the landscape. The plant dries early in the summer and remains highly flammable throughout the fire season creating dangerous conditions on the ground. When fire strikes, firefighter safety is the paramount concern because escape routes and safety zones are difficult to establish due to rangeland fire's rapid spread. With high temperatures, low relative humidity, and strong winds, rangeland fires can spread quickly and produce flame lengths that often prevent direct attack. A wind-driven rangeland fire in cheatgrass can easily burn thousands of acres in an hour, destroying homes, livelihoods, and habitat along the way. If left unchecked, cheatgrass often invades sagebrush habitat after rangeland fires, creating conditions for more frequent, intense fires in the future. For these reasons, the "fire-and-cheatgrass cycle" is a particularly difficult challenge for land managers.

Figure 1. Fire-Cheatgrass-Cycle

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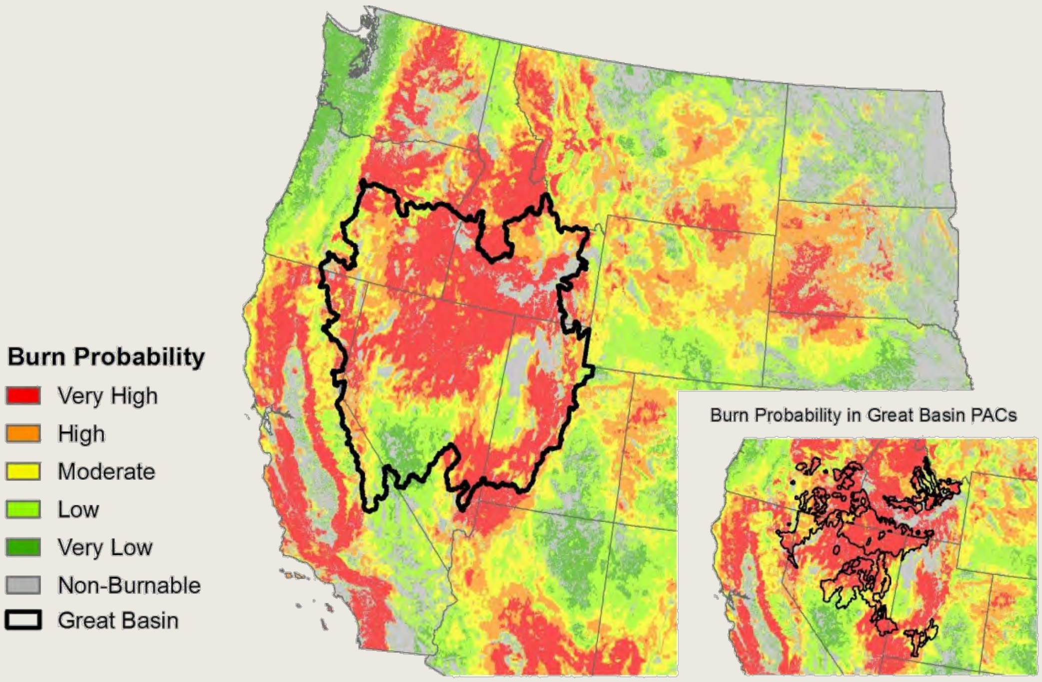
[1] Michael Wisdom, PNW Research Station, USDA Forest Service, La Grande, Oregon.

The increasing frequency and intensity of rangeland fires and conversion of sagebrush-steppe ecosystems to invasive annual grasses poses a major threat to ranchers, local communities, and others who live and work on the iconic sagebrush-steppe landscape and depend on these lands and resources to sustain their livelihoods and quality of life. This unique American landscape supports energy development, ranching, and outdoor recreation such as hunting, hiking, and camping. According to BLM, over 1,000 communities are near sage-grouse habitat, and many of the Nation's treasured cultural and archaeological sites dot the sagebrush-steppe landscape.

More intense rangeland fires also pose an increased threat to the more than 350 species of birds, plants, and animals, including the greater sage-grouse that rely on this critically important ecosystem.

In 2010, the U.S. Fish and Wildlife Service (FWS) identified the invasion of non-native annual grasses and the loss of habitat, from the increased frequency and intensity of wildfire in the Great Basin, as the primary threat to the greater sage-grouse in that portion of its remaining range. The threat is particularly great in places identified as primary areas of conservation (PACs) where greater sage-grouse experts have indicated that protecting existing habitat is critical to the birds' continued viability[2]. The FWS is currently considering whether the species warrants protection under the Endangered Species Act.

Figure 2. Extent of the fire probability in Great Basin sagebrush-steppe habitat (most current information as of May 2015)



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[2] U.S. Fish and Wildlife Service. 2013. Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final report. US Fish and Wildlife Service, Denver, Colorado, February 2013.

Nationally, annual average acres burned by wildfire rose from 2.9 million acres per year in the 1980s to 3.3 million in the 1990s, and then jumped to an average of 6.6 million acres burned per year from 2000 through 2009. Since the 1960's when accurate recordkeeping began, 8 of the 10 worst fire seasons, for national acres burned, have occurred since 2000. This trend is particularly problematic for the sagebrush-steppe ecosystem, where the pace of fire dwarfs the rate of recovery. During just 3 fire seasons from 2012 to 2014, nationally nearly 17 million acres burned, of which nearly 3.8 million were greater sage-grouse habitat in the western states.

The increased frequency and impact of rangeland fires necessitates an enhanced approach to address rangeland fire in the Great Basin and other sagebrush-steppe areas. The DOI, U.S. Department of Agriculture (USDA), tribes, other Federal, state, and local agencies, private industry, and various non-governmental organizations (NGOs) are working to meet the challenge to address rangeland fire more effectively. In particular, they are working together to better prevent fires, improve efforts to suppress fires when they occur, and to increase the effectiveness of efforts to restore landscapes impacted by fire. Reducing the frequency and intensity of rangeland fires is essential to protect the safety of communities in the sagebrush-steppe landscape and the livelihoods of their residents. In addition, a more effective strategy for addressing the threat of rangeland fire is critical to reducing the risk it poses to the continued viability of the greater sage-grouse, an important component of the overall strategy to conserve the species across its range.

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Departmental Response

> ***Protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority greater sage-grouse habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department.***

Recognizing the conditions on the land and the need to protect and conserve the sagebrush-steppe ecosystem and greater sage-grouse habitat, DOI convened *The Next Steppe: Sage-Grouse and Rangeland Fire in the Great Basin* Conference (*Next Steppe* Conference)[3] in November 2014. The *Next Steppe* Conference brought together leading scientists and researchers in restoration, fire, and invasive species ecology, and wildland fire management, key policymakers, land managers, natural resource managers, fire managers and firefighters, tribal, and community leaders, and other stakeholders to discuss how to address the escalating threat of rangeland fire. The *Next Steppe* Conference provided important information on the means to improve rangeland fire prevention, suppression, and the restoration of fire-impacted landscapes, and provided an additional and important source of knowledge, information, and expertise. The *Next Steppe* Conference was an opportunity to build upon the experiences and successes of addressing rangeland fire prevention, suppression, and restoration efforts to date, including the *National Cohesive Wildland Fire Management Strategy* (Cohesive Strategy) to inform an improved effort to reduce the threat of rangeland fire in the future.

Following the *Next Steppe* Conference, on January 5, 2015, DOI Secretary Jewell signed *Secretarial Order 3336 - Rangeland Fire Prevention, Management, and Restoration* (the Order). The Order emphasizes that rangeland fire management is a *critical priority* for "protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat, while maintaining safe and efficient operations." The Order also emphasizes that the "allocation of fire resources and assets before, during, and after wildland fire incidents will reflect this priority." The Order directed the creation of a Rangeland Fire Task Force to deliver a science-based comprehensive strategy to reduce the threat of large-scale rangeland fire to greater sage-grouse habitat and the sagebrush-steppe ecosystem, and set forth guiding principles and overarching expectations in Sections 5 and 6 of the Order, respectively. Elements of the Strategy include effective rangeland management, fire prevention, fire suppression, and restoration at a landscape-scale.

The Order directed the Task Force to develop and deliver an Implementation Plan, Initial Report, and Final Report to the Secretary. The *Implementation Plan*, completed and issued on February 1, 2015, outlined the work plan for implementing the Order. The Initial Report, *S.O. 3336 – The Initial Report: A Strategic Plan for Addressing Rangeland Fire Prevention, Management, and Restoration in 2015*, delivered to the Secretary on March 1, 2015, identified specific actions for

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[3] For more information on the Next Steppe Conference please go to: http//www.nifc.gov/fireandsagegrouse/

DOI, and its partners, to undertake prior to the onset of the 2015 Western fire season to improve the efficiency and effectiveness of rangeland fire management efforts (see Appendix B).

Building on the Initial Report, this Final Report, *An Integrated Rangeland Fire Management Strategy* outlines an approach for improving the efficiency and efficacy of actions to better prevent and suppress rangeland fire and to improve efforts to restore fire-impacted landscapes both including and beyond 2015 (see Appendix B). These activities involve targeted investments to enhance efforts to manage rangeland fire in specific portions of the Great Basin region, based on relative resilience and resistance to fire, consistent with efforts on tribal, state, and other lands, and in keeping with the trust responsibilities to Indian tribes and various statutory obligations. The actions in this Final Report primarily focus on the needs of the Great Basin, but the strategies developed (or lessons learned) will be applied range-wide where there is benefit to sagebrush-steppe habitat and greater sage-grouse.

The DOI held a listening session and two government-to-government tribal consultations and considered feedback from tribal leaders in developing the actions and activities included in the Strategy. In addition, DOI hosted two conference call sessions to answer questions on development of the Strategy and invited partners, stakeholders, and the public to submit formal public comment on the draft reports. Tribes, states, and partner agencies provided input to the task groups responsible for drafting the actions incorporated into the Strategy. Federal partner agencies include the USDA's Forest Service (USFS) and Natural Resources Conservation Service (NRCS), and the Department of Homeland Security's (DHS) U.S. Fire Administration (USFA).

Continued active engagement, involvement and input from states, tribes, stakeholders and other partners is critical as we move forward. The goals for engagement related to this Order are to (1) explain the Order, its genesis, and its implementation; (2) continue state, tribal and stakeholder involvement in implementing the Order; and (3) gather and consider state, tribal and stakeholder input during implementation into the future. Implementation of the Strategy will take place in continued consultation with tribes and cooperation and coordination with other Federal, state, local, private partners, and NGOs.

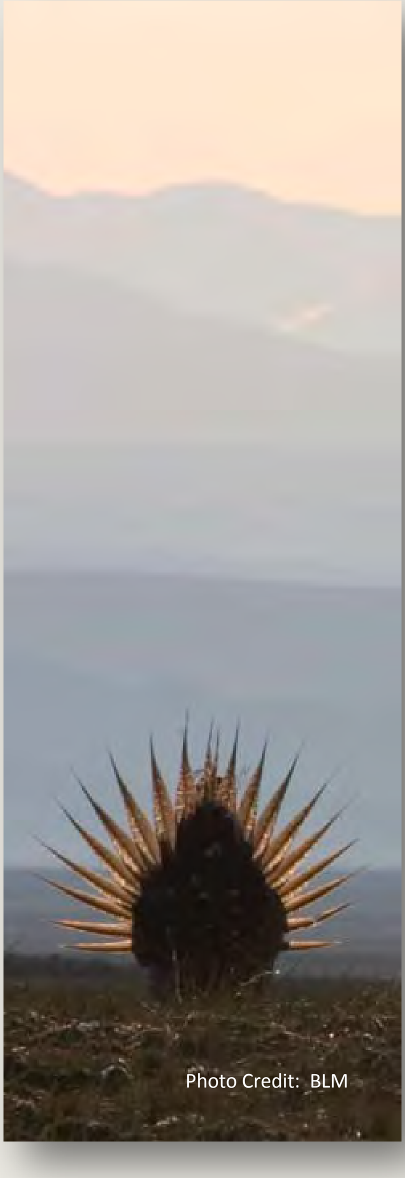

Photo Credit: BLM

The Strategy

The Strategy addresses all aspects of rangeland fire management, including improved fire prevention, enhanced fire suppression, and an increased emphasis on successful rangeland restoration. Key to the development and implementation of this Strategy are certain principles that are applicable to all aspects of rangeland fire and invasive plant species management; and, if properly applied, can significantly improve rangeland fire management and restoration efforts for sustainable sagebrush-steppe ecosystems.

Principles for Success

Work on a Landscape Scale


Photo Credit: NRCS

Protecting, conserving, and restoring healthy sagebrush-steppe ecosystems is a landscape-scale issue and requires a landscape-scale approach. A landscape-scale approach to management is one that emphasizes sustainability of entire ecosystems, integrates stakeholder collaboration, and addresses the present and possible future conditions of lands across ownerships. Since the sagebrush-steppe ecosystem crosses 11 western states and 2 Canadian Provinces, and has species such as the greater sage-grouse that range across this expansive area, it is important to conduct science and make management decisions at a larger scale. Use of this strategic, rather than opportunistic, approach will focus management actions that will result in more effective, cumulative efforts to maintain, restore, and sustain this important ecosystem.

The DOI agencies and their partners understand that short-term, isolated treatments alone do not result in long-term recovery or sustainability of a large landscape. Vegetation inventories, treatments, and preventative measures to reduce the risk of rangeland fire such as the appropriate use of herbicides, biological controls, biocides; prescribed fire, greenstripping, and fuel breaks; and the prioritization of efforts to restore fire-impacted landscapes, must be planned and conducted on a landscape-scale, across jurisdictional boundaries in collaboration with tribes, states and key stakeholders for lasting effectiveness. Thinking and planning holistically, and applying actions that take into consideration the needs of an entire ecosystem will result in a healthy sagebrush-steppe landscape that can support sustainable populations of greater sage-grouse.

Planning at a landscape-level can reduce the time and expense associated with developing management actions at multiple individual sites. Working at a landscape level can also facilitate and expedite National Environmental Policy Act (NEPA) analysis, permitting expeditious completion of individual projects that are associated with a larger landscape management plan by tiering to landscape-level environmental analysis. Time is of the essence in re-vegetating fire-scarred lands. For this reason, more efficient, timely, and strategic planning for restoration projects can reduce costs and expedite implementation of appropriate management measures to restore healthy landscapes.

Promote "All Hands, All Lands" Management

Just as wildfires know no boundaries, planning, projects, and collaborative work to address them must, with mutual agreement, cross ownership lines and jurisdictional boundaries to be effective. Embracing an "All-Hands, All-Lands" management approach and building on the goals of the Cohesive Strategy are essential to this concept. Further expansion of collaboration with other Federal, state, and local agencies, tribal governments, private industry, and NGOs to work smarter, leverage resources, and enhance effectiveness is vital to reducing the habitat lost improving the health of the sagebrush-steppe ecosystem and achieving social, economic, and ecological goals. Including tribes and state agencies in the identification of fuels (vegetation) management priorities and in aligning resources to leverage assets for fuels treatment can help further reduce fire risk.


Photo Credit: NRCS

An important "advance" in this regard is to bring together resource managers, biologists, and other scientists, and fire program leaders at all levels to identify ways in which they can help each other understand how to manage landscapes to reduce fuels and fire risk and improve restoration success of lands impacted by fire. For example, because reducing fuels – particularly the rapid spread of invasive species such as cheatgrass – is a critical part of the strategy for reducing future rangeland fires and protecting important habitat, it is important that vegetation management and habitat restoration (not simply building firebreaks or applying prescribed fire) be an integral part of the solution.

Addressing improper grazing practices, where they occur, can reduce the likelihood of non-native annual grass invasion. However, grazing can also be a tool which, when properly used, can help manage fuels at critical times. Technical support and incentives for livestock producers to work with Federal and state partners to implement targeted fuel treatments would capitalize on their knowledge and could align essential resources. Similarly, technical assistance and incentives for livestock producers and grazing permittees accelerate and increase the success of efforts to restore fire-impacted lands to native grasses, forbs, and sagebrush and help prevent cheatgrass and other non-native invasive species from becoming established.

Partnerships make it easier to work across agency and other jurisdictional boundaries, not just to expand treatments, but also to leverage funding, experience, capability, and knowledge about best management practices. Partnerships must go beyond improvements in collaboration among Federal land and resource management agencies and must be inclusive. Collaborative efforts should include groups with an interest and expertise in rangeland fire prevention, suppression, and restoration. At a minimum, the following groups will be invited to collaborate: the Western Governors' Association; the Western Association of Fish and Wildlife Agencies; Great Basin Landscape Conservation Cooperative; Intermountain West Joint Venture; Great Basin Fire Science Exchange; state wildland fire, wildlife, and agricultural agencies; Indian tribes, including incorporation of traditional ecological knowledge; scientists and researchers; local/rural fire departments and Rangeland Fire Protection Associations (RFPAs); weed collaboratives; native seed production organizations; soil and water conservation districts; NGOs, and the conservation community.

Employ a Risk-Based Approach

Management resources are limited; some lands will recover naturally, but many require active restoration. Not every acre can be effectively treated to prevent rangeland fires, nor can every acre impacted by fire be restored. Setting priorities for prevention, suppression, and restoration is essential to increase the efficiency of operations and the efficacy of treatments.

For this reason, the Strategy relies, in part, on the Fire and Invasive Assessment Tool (FIAT)[4] to assess the major threats to the sagebrush-steppe in order to conserve the greater sage-grouse and its habitat. "Resilience" and "resistance" to rangeland fire is the basis of FIAT. In simple terms, "resilience" is the ability of an area to recover from a disturbance, such as wildfire or drought. "Resistance" is the ability of an area of land to remain largely unchanged in the face of stress, disturbance, or invasive species. A resilient, resistant landscape will have integrity and be less susceptible to conversion to invasive annual grasses and landscape-scale, high-intensity fires and their effects.

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[4] The purpose of the FIAT is to identify priority habitat areas and management strategies to reduce the threats to greater sage-grouse resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The FIAT is a process that uses the best available information from many disciplines including ecology, biology, soils, fire science as part of a strategic framework. The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers, et al., 2014). The final FIAT process report was completed in June 2014 by the Fire and Invasive Assessment Team.

Applying these key concepts to vegetation management will contribute to sage-grouse habitat conservation and restoration and will support fire operations by helping to limit the size and dangers associated with fast-moving fires.

The BLM and partners, designated specialists, and land managers completed a landscape assessment process using the FIAT (see Appendix C). The teams' efforts culminated in five detailed assessments focused on how BLM and its partners can work together to protect the greater sage-grouse, and in turn, improve the health of the sagebrush-steppe ecosystem. The FIAT is not a one-time assessment, rather developed to incorporate new data and complete a reassessment as needed to inform management actions. The use of risk-based, landscape-scale tools, such as the FIAT, will help prioritize treatment areas to reduce fire risk as well as set priorities to strategically-guide the allocation and pre-positioning of resources for fire suppression and better align funding sources for post-fire restoration efforts.

Improve the Application of Science and Technology

Resistance/Resilience

The Difference

In simple terms, "resilience" is the ability of an area to recover from a disturbance, such as wildfire or drought. "Resistance" is the ability of an area of land to deflect the same kind of disturbances.

Inherent in the Strategy is recognition that a strong science foundation is fundamental to successful rangeland fire prevention, suppression, and restoration. As demonstrated by the development and application of the FIAT to guide future sagebrush-steppe and greater sage-grouse conservation efforts, improved coordination of science and research and field experimentation, testing and application of the products of this work is essential.

This includes continual improvement in integrating natural resource and fire management objectives in order to coordinate efforts toward achieving common overall goals and objectives, and more effectively using science to help identify, conserve, and create resilient and resistant landscapes for the long term. Innovative practices, supported by emerging science, need to move forward, be tested, and rapidly deployed where safe and effective to do so.

In addition, better use of technology to communicate key information quickly and simply to resource managers and wildland firefighting personnel, such as the location of previously identified resistant and resilient landscapes and high priority habitats, can improve the efficacy of firefighting and restoration efforts. Fire crews at the *Next Steppe Conference* spoke of the value of having maps of these areas readily available to them in the field as they make critical decisions regarding firefighting strategy. Existing technology, with geospatial capability such as tablets and smart phones, if made available to resource managers, incident commanders, and fire management officers, could speed the translation of science into management actions quickly and effectively at low cost.

Monitor and Adapt for Success


Photo Credit: SGI

SUCCESS MEANS

- Reducing acres of sagebrush lost to fire
- Reducing acres of sagebrush lost to invasive species
- Increasing acres of healthy sagebrush habitat to benefit human and natural communities

Established monitoring and metrics to evaluate the effectiveness of management actions must occur to determine the success of fire prevention, suppression, and restoration actions. Developing a monitoring and evaluation framework with protocols, standards, and capacity will provide compatible indicators, methods, and sample designs and ensure consistent data and data management, resulting in readily accessible and comparable data. Lessons learned from evaluations can be shared and inform changes to, (1) correct for ineffective management prescriptions, (2) respond to changes in resource conditions, (3) guide new science and research needs, and (4) address changes in management policy and direction. Monitoring and evaluation is an essential part of adaptive management and depends upon timely information, analysis, and learning.

Strategic application of new management techniques, improved use of risk analysis to set management priorities, and the translation of science and research findings into tools for easy use on the ground to prioritize prevention, suppression, and restoration efforts can help improve the efficacy and efficiency of rangeland fire management. However, we cannot be certain that we are achieving desired outcomes without careful monitoring and evaluation of our management efforts. This is an essential part of learning and central to the application of the adaptive management approach we will apply to better manage the sagebrush-steppe ecosystem and conserve the greater sage-grouse.

The key principles, (1) work on a landscape-scale, (2) promote “All Hands, All Lands” management, (3) employ a risk-based approach, (4) improve the application of science and technology, and (5) monitor and adapt for success**,** are fundamental to our ability to successfully implement the Strategy.

Success is effectively reducing the sagebrush-steppe acres lost to fire and invasive species in a safe and efficient manner, while increasing the sagebrush-steppe acres restored to a healthy condition. If successful, we can increase the habitat restored to a healthy condition for the greater sage-grouse and other sagebrush-steppe dependent species and assure that all communities associated with the sagebrush-steppe ecosystem realize the benefits.

Fire Prevention, Suppression, and Restoration

Improve Fire Prevention: Manage Vegetation to Reduce Fire Risk


Photo Credit: BLM

Invasive annual grasses, primarily cheatgrass, dominate about 25 million acres of the Great Basin. Cheatgrass contributes to the size and frequency of fires and directly threatens the habitat of the greater sage-grouse and other sagebrush-steppe dependent wildlife. Vegetation management at this scale is complex and requires aggressive and targeted application of both proven techniques and the rapid investigation and implementation of new practices to control cheatgrass and mitigate habitat impacts from unwanted rangeland fire. Land managers need tools to reduce cheatgrass while simultaneously restoring resilient sagebrush-steppe ecosystems that can withstand fire and resist re-invasion of cheatgrass or other invasive species. This work necessitates increased coordination and efficient use of NEPA procedures, partnerships, and funding, to increase capacity to treat more acres effectively. The goal is to protect, conserve, and restore greater sage-grouse habitat at a faster rate than it is lost to invasive species and rangeland fire. Effective strategies developed for early detection and rapid response (EDRR) and implemented in collaboration with a wide range of stakeholders, can help check the rapid expansion of invasive non-native species. Monitoring for success will continue to highlight what technique work most effectively and cost efficiently.

The expansion of native pinyon and juniper into sage-grouse habitat can also degrade the sagebrush-steppe ecosystem. Altered fire regimes allow pinyon and juniper to expand into long-established sagebrush-steppe ecosystems, where they out-compete native grass and understory vegetation and convert these areas to woodlands.

Vegetation treatments to reduce pinyon and juniper must consider the cultural importance of native vegetation to tribes, along with the need to restore sagebrush-steppe habitat. Generally, the treatments aim to remove younger trees that are expanding into sagebrush-steppe vegetation communities, while maintaining historic woodlands. Improved communication and partnership with tribes on management strategies to conserve traditional uses and recognize cultural values is essential to finding an appropriate balance to this issue.

Target Suppression: Protect Remaining Priority Habitat

Wildland fire managers already coordinate closely and leverage resources to apply a risk-based, integrated, collaborative fire response across jurisdictional boundaries. The Strategy will enhance efforts to identify important sagebrush-steppe habitat and inform fire response in these areas. Effective integrated response begins before the fire season starts, is communicated from leadership to the field, and is included in dispatch plans to ensure that the priority sagebrush-steppe habitat is recognized as a critical fire management priority when rangeland fires occur.

Improve Preparedness


Photo Credit: BLM

Where priority greater sage-grouse habitat exists, pre-positioning of firefighting assets to improve preparedness and suppression capability in the initial stages of a wildfire increases the chances of keeping fires small and limits loss of greater sage-grouse habitat. Pre-positioning firefighting assets from other parts of the country (as they are available) will bolster Great Basin rangeland firefighting resources during critical times of the year. For example, in the Southeast, Southwest, and Alaska geographic areas, when fire season is winding down, the Great Basin is historically experiencing increased wildfire activity. Movement of agency rangeland firefighting assets from those areas to priority locations improves initial attack capability. In addition, established “draw-down levels” in the Great Basin will reduce the risk of a shortage of firefighting assets in greater sage-grouse habitat.

Increase Natural Resource and Fire Management Collaboration

Natural resource advisors and fire managers, at all levels, must coordinate and work collaboratively to identify priority habitats before and throughout the wildfire season to improve fire response and protection of priority sage-grouse habitat. The DOI is taking additional steps to help firefighters know where important greater sage-grouse habitat is located. Continuing in the 2015 fire season, when rangeland fires affect priority greater sage-grouse habitat, particularly in the FIAT identified areas, managers will dispatch resource advisors and provide maps depicting highest priority locations of greater sage-grouse habitat to crews working in key areas.

Enhance the Use of Veterans and Other Trained Resources

Employment of veterans is one of the highest priorities of DOI, and, in particular, for BLM. Active recruitment of returning veterans to the civilian workforce supplements and augments the existing veterans in the Federal wildland firefighting ranks, and increases the number of qualified firefighters available to respond. Increasing the training, coordination, and technical assistance for local/rural fire departments and RFPAs is essential to provide local protection and offers another way of extending suppression assets and ensuring that we have as many trained "boots on the ground" for initial attack as possible. Immediate response and successful initial attack are keys to keeping rangeland fires small, reducing risk to firefighters, and limiting the potential loss of important habitat. Proper training is a critical component to ensure firefighter safety and DOI will continue to invest in training and equipping local volunteers, RFPAs, and veterans' crews to add to the overall suppression capability.

Improve Restoration Success

One of the primary challenges to restoring the health of the sagebrush-steppe ecosystem is achieving effective long-term restoration and post-fire recovery. Arid sagebrush-steppe rangelands face many environmental and site condition stresses exacerbated by drought, climate change, and spread of invasive plants, leading to more frequent and catastrophic fires. While restoration can be successful at the small scale, a landscape level effort and adequate long-term funding is required to achieve effective and sustainable restoration of the sagebrush-steppe. As with vegetation management, to maximize success, restoration approached on a landscape scale in partnership with cooperators, is vital. This includes identification and efficient use of NEPA procedures and other environmental compliance processes, strong monitoring programs, metrics for success, incorporating science, and adaptive management. Landowners and land managers across the Great Basin are addressing challenges on a number of fronts with the intent of enhancing, promoting, and succeeding in rehabilitating and restoring the health of the sagebrush-steppe landscape and greater sage-grouse habitat, in particular.

Photo Credit: Conservation Media

Link Short and Long-term Restoration Efforts

One key element of this effort is to use a risk-based approach in setting priorities for and implementing rangeland restoration strategies. When needed in the short-term, the Emergency

Stabilization (ES) and Burned Area Rehabilitation (BAR) programs provide funding to establish vegetation quickly on areas impacted by fire in order to reduce the potential of further resource damage. Currently, other agency land and resource management programs provide the funding, as available, for long-term restoration and recovery. Establishment of vegetation on these landscapes is essential for reducing habitat loss and conversion to cheatgrass and other invasive species.

Consistent with the policy articulated in the Order, the ES and BAR programs are undergoing an update to include restoration of rangelands, linking ES and BAR investments with overall restoration and recovery activities. Agency land and resource management programs that provide funding for long-term restoration and recovery must link to the ES and BAR programs to ensure that funding is adequate to address both short-term revegetation needs and the long-term goal of successful restoration of fire-impacted landscapes. Added flexibility in the use of short-term funds and a clear commitment to ensure that funding for long-term restoration is made available are essential if fire-impacted lands are to be restored to native vegetation in a timely manner.

Expand Use of Native Seeds and Seedlings

Native plant communities, especially those containing perennial native grasses and forbs essential to ecosystem integrity and diversity, provide ecosystem services that sustain wildlife, such as greater sage-grouse and native pollinators. Perennial grasses are the best competitors with invasive annual grasses and promote resilience. A reliable supply of genetically appropriate and locally adapted seed, as well as seeding technology and equipment, is needed for effective restoration of the sagebrush-steppe ecosystem. Through the Plant Conservation Alliance, more than 300 non-federal and 12 Federal agencies are currently working collaboratively to develop the *National Seed Strategy*[5]. When complete, the *National Seed Strategy* will guide the development, availability, and use of seed needed for timely and effective restoration. Maintaining an effective and efficient supply of seeds, seedlings, and other plant materials, with emphasis on enhancing the production and use of native seeds and seedlings, is at the core of a successful, landscape-scale post-fire restoration effort.

While the use of genetically-appropriate plant materials is strongly encouraged, the Strategy does not preclude the use of non-native plant materials in instances where and when they are appropriate. It is important to note that the Strategy recognizes that land managers in some agencies may plant non-native species to achieve site stabilization, wildfire breaks, or invasive plant control, but that the use of non-natives should be limited to transitional, non-invasive species, replaced by natives in subsequent ecological restoration or during natural successional processes.

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[5] The National Seed Strategy will include objectives and actions to meet four main goals: (1) Identify seed needs and ensure the reliable availability of genetically appropriate seed reserves; (2) Identify research needs and conduct research to provide genetically appropriate seed reserves and to improve technology for seed production and ecological restoration; (3) Develop tools that enable managers to make timely, informed seeding decisions for ecological restoration; and (4) Develop strategies for internal and external communication.

Establish a Coordinated Science Action Plan

In the past two years, Federal and state agencies have made considerable strides in identifying and prioritizing science needs for suppressing unwanted rangeland fire, controlling invasive plants, and restoring sagebrush-steppe. Examples include the USGS *Greater Sage-Grouse National Research Strategy*, WAFWA report, *Wildfire and Invasive Species in the West: Challenges that Hinder Current and Future Management and Protection of the Sagebrush-steppe Ecosystem—A Gap Report,* and USFS's draft *Sage-Grouse Conservation Science Strategy*. A review of these and other reports, and a multi-agency analysis of the gaps in our understanding of invasive species, wildland fire impacts, and management techniques will determine the highest priority science and research needs related to sagebrush-steppe ecosystems. This analysis will guide new actions aimed at filling the greatest knowledge gaps, define implementation needs, and direct science information delivery to practitioners on the ground. One excellent demonstration of the benefit of the application of research and science to management, in the context of our efforts to conserve the greater sage-grouse, has been the success of the NRCS Sage-Grouse Initiative (SGI). Land managers, landowners, and other stakeholders rely on scientific information to improve their ability to reduce the threat of fires and restore rangeland habitats. Considerable research is underway to address rangeland health, habitat, and fire effects. Successful application of that science in the field is crucial to enhance and improve success across the landscape in fuels management, rehabilitation, and restoration efforts.

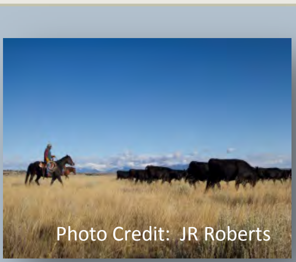
Photo Credit: JR Roberts

NRCS SAGE-GROUSE INITATIVE

One excellent demonstration of the benefit of the application of research and science to management in the context of our efforts to conserve the greater sage-grouse has been the success of the NRCS Sage-Grouse Initiative.

Long-term success of rangeland fire management efforts relies largely on creating and restoring landscapes that are resistant to invasive species and resilient to disturbance. Recent and emerging science is linking the resistance and resilience of sagebrush-steppe ecosystems to restoration and conservation strategies. Future research on new management options will enhance success while diminishing the costs of rangeland fire prevention, suppression, and restoration efforts.

Fast-paced research on restoring sagebrush-steppe habitat and controlling invasive plants is looking at what works, and what does not. For example, research regarding effective biocide controls of cheatgrass and studies on successfully establishing sagebrush-steppe are vital in addressing non-native invasive species control and successfully restoring or rehabilitating rangelands for the landowners and wildlife species that depend on them. Improving access to


Photo Credit: Conservation Media

applicable scientific information will facilitate and enhance efforts to protect, conserve, and restore important habitats and overall rangeland health. Creating a system that delivers the most current scientific information, interprets its use for management, provides a feedback loop to identify new research needs based on field results, and provides tools and services needed by managers will improve understanding and use of science. Mechanisms to accelerate registration and labelling of new, environmentally safe, and effective control agents would also help stem the conversion of native grasslands to cheatgrass and other invasive species and accelerate restoration of the health of sagebrush-steppe landscapes.

We can strengthen our efforts by linking existing Great Basin research and information groups, such as the Great Basin Research and Management Partnership, the Great Basin Landscape Conservation Cooperative, the Great Basin Fire Science Exchange, the Great Basin Native Plant Project, and the Sagebrush-Steppe Evaluation Project as well as universities and land grant colleges involved in similar research. Additionally, by increasing dissemination, interpretation, and application of new fire science and research through an improved system for science delivery, we will enhance use of science in day-to-day management decisions.

A science action plan aimed at expanding collaboration between science and management communities to discover, synthesize, interpret, and deliver new information to resource managers will improve the effectiveness of fire prevention, suppression, and restoration efforts.

Improve Management Efficiency and Effectiveness


Photo Credit: JR Roberts, Conservation Media

The successful implementation of the Strategy will require measures to improve management actions across agencies, jurisdictions, and programs. It will challenge resource managers, scientists and researchers, fire managers, and policy makers at the Federal, state, tribal, and local levels in government and among various private interests and stakeholders to collaborate, coordinate, and innovate in new ways.

Implementation, Coordination, and Accountability

Successful implementation of the Strategy and supporting actions requires a clear and sustained commitment to interdisciplinary and interagency collaboration, in all aspects of rangeland fire management – from prevention to suppression and restoration. Given that responsibility and authority for various aspects of fire management are shared among bureaus and agencies, organizations, and programs in the DOI, other Federal departments, tribes, and at regional, state, and local levels, a commitment to collaboration is essential.

Developing a dedicated, interagency, interdisciplinary executive team to lead the implementation and oversight of this Strategy, with adequate staff-level support, is an important first step. The benefit of this approach is that it could help breakdown the "silos" that traditionally inhibit the kind of partnership, innovation, and collaboration envisioned in the further development and implementation of this Strategy.

Geospatial Management Strategies

Identification of geospatially-explicit management strategies to limit the likelihood of habitat loss due to fire and targeted management strategies to improve resilience will further efforts to conserve important greater sage-grouse habitats. Geospatial tools and enhanced data sharing can provide a common framework, data, and terminology to support the implementation of the Strategy by helping to provide a common set of metrics to monitor resource conditions and the effectiveness of management actions consistent with an adaptive management paradigm.

Environmental Review and Compliance

Successful implementation of greater sage-grouse conservation at the landscape-scale requires timely and efficient environmental compliance procedures. Soon, land use and resource management plans will be amended with supporting environmental reviews to reflect the goals of protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat. Programmatic and other streamlined environmental reviews to support vegetation management, restoration investments, and other activities can achieve additional efficiencies. By planning at a landscape-scale, environmental review and compliance can be more efficient and less costly and time consuming.

Resources and Funding


Photo Credit: BLM

At present, resources (e.g., staffing and expertise) are shared between multiple agencies and organizations, including, but not limited, to DOI, USFS, and NRCS, and various state and local agencies. To fully implement the Strategy and supporting activities, will require a commitment of funding over multiple years, and coordination among the agencies and organizations involved in the Strategy, with an integrated approach to budget development and implementation. A multi-year, integrated funding plan will help identify requirements, priorities, sources, and opportunities for shared and leveraged funding across agencies and disciplines.

The current approach to budgeting for wildland firefighting and restoration stymies efforts to implement a more efficient and effective strategy for the prevention and restoration work envisioned by this Strategy.

The President’s fiscal year 2016 budget request renews the call for a new funding framework for wildfire suppression, similar to how the costs for other natural disasters are met. The initiative proposes base level funding of 70 percent of the 10-year average for suppression costs within the discretionary budget with the remaining identified suppression funding need provided through a budget cap adjustment. One percent of the most severe fires comprise 30 percent of the costs. This is a commonsense proposal, with bipartisan Congressional support, that helps ensure DOI and USDA do not take funding from other important program budgets, such as fire prevention, in order to fight the Nation’s most catastrophic fires. Providing stability to the fire budget through the budget cap adjustment will enhance the long-term implementation of actions identified in this Strategy that would help to reduce the risk and harm of rangeland fires, as well as the associated costs.

Summary

The DOI, along with our partners, is prepared to respond to rangeland fire on important landscapes and to implement best-management practices to improve fire management and restoration efforts. While the strategy illustrates DOI's commitment to improving our efforts to protect and conserve important rangeland and sagebrush-steppe ecosystems and habitat, DOI remains firmly committed to the safety of firefighters and the public. Safety is and will remain the number one fire management priority.

The DOI is committed to implementing the vision articulated in the Order to improve measures for the effective and efficient implementation of a landscape-scale, science-based, collaborative strategy that addresses the critical priority of rangeland fire in the West and reduces the risk it presents to the people, communities, and resource and cultural values of the region. This effort will depend on a coordinated and collaborative approach involving Federal departments and agencies, the states, tribes, local governments, research institutions and universities, and the many stakeholders with a stake in the health of the sagebrush-steppe ecosystem, the greater sage-grouse, and the hundreds of other species associated with this unique and iconic American landscape.

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Appendix A - A Set of Longer-Term Actions and Activities[6]

Cross-Cutting Action Items

Issue Description/Overview

These actions cut across multiple topical areas and support the overall implementation of the Strategy.

Action Item #1

Develop interagency capability and functionality to provide ongoing coordination, oversight, and accountability to ensure timely and appropriate implementation of the Strategy and supporting action items. Dedicated interagency executive and staff-level direction, coordination, and oversight will enhance integration and commitment to long-term, multi-year restoration investments by providing continuity over time as well as providing accountability for completion of the action items.

Responsibility:

Leads: Rangeland Fire Task Force

Target to Complete: Third Quarter 2015 and ongoing

Action Item #2

Develop and share a geospatial tool that highlights areas of concern and priority habitats in the Great Basin, including within priority greater sage-grouse habitat, particularly in areas identified using the FIAT. This tool will provide a common framework and common terminology to support the implementation of the Order.

Responsibility:

Co-Leads: USGS Associate Director for Core Science Systems

Support: BLM Assistant Director for Fire and Aviation, BLM Assistant Director for Renewable Resources and Planning, and DOI Geospatial Information Officer

Target to Complete: Third Quarter 2016

Action Item #3

Establish an interagency framework with protocols, standards, and capacity to conduct long and short-term monitoring at all appropriate scales, of the sagebrush-steppe ecosystem condition and the effectiveness of fire prevention, fire suppression, and habitat restoration. Use adaptive management to respond to changing conditions, guide new science, and adjust management practices and policy. The approach will focus on evaluating the effectiveness of

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[6] Quarters are defined as calendar year (e.g., first quarter ends March 31; second quarter ends June 30; third quarter ends September 30, and fourth quarter ends December 31 each year).

management actions, including fuels treatments, invasive species control, and restoration efforts, and the effects of these actions on habitat condition and trends. Resultant data and information informs resource management, at multiple scales, and supports the process of adaptive management.

Responsibility:

Co-Leads: USGS Associate Director for Ecosystems for development of monitoring framework; BLM Assistant Director for Renewable Resources and Planning for field implementation of monitoring

Support: USFS and other appropriate Federal and state agencies and tribes

Target to Complete: Fourth Quarter 2016

Action Item #4

Develop and implement efficient and appropriate National Environmental Policy Act (NEPA) and other environmental compliance processes. Develop approaches within existing law to implement NEPA, Endangered Species Act (ESA) and National Historic Preservation Act (NHPA) compliance effectively, to shorten planning times for conducting analysis of projects at a landscape and site-specific scale, and lengthen usability times of environmental documents by incorporating adaptive management alternative analyses. Initiate and complete programmatic NEPA, ESA, and NHPA processes in the FIAT assessment areas for landscape-level fuels treatments and restoration.

Responsibility:

Co-Leads: Assistant Secretary – Policy, Management and Budget, Assistant Secretary – Land and Minerals Management

Support: BLM, FWS, BIA, NPS, and other supporting agencies

Target to Complete: Third Quarter 2015 to develop process, including schedule for implementation

Action Item #5

Develop multi-year resource and action plan to implement the Strategy and supporting actions and develop tools to facilitate integrated budget development and track implementation. A multi-year, integrated resource and action plan would identify requirements, priorities, sources, and opportunities for shared and leveraged funding across agencies and disciplines.

Responsibility:

Lead: Assistant Secretary – Policy, Management and Budget

Support: DOI Assistant Secretaries and Bureau Directors, coordinated with USDA

Target to Complete: Ongoing

Action Item #6

Enhance Funding Leverage and Collaboration with Partners. Leverage and expand current collaborative landscape efforts that integrate partnership interactions among Federal, tribal, state, and local governments, and private and NGO collaborators, including to identify (and make known) available Federal funding tools for work within and outside of Federal agencies to implement fuels treatments and restoration across jurisdictions on Federal, tribal, state, and private lands. Programs include but are not limited to: Stewardship Contracting, Wyden Amendment (Public Law 109-54, Section 434), Sikes Act (16 USC 670a-670o, 74 Stat. 1052), Service First (Public Law 106-291), Interagency Agreements, Good Neighbor Authority (16 U.S. Code § 2113a), DOI-Resilient Landscapes (RL) BLM's Healthy Lands program, USDA-Joint Chiefs' Initiative, USFS-Collaborative Forests Landscape Restoration Program and NRCS Sage-Grouse Initiative and other programs. In addition, as appropriated funds allow, the Department can use the following statutes to leverage improvement when working with tribes: The National Indian Forest Resources Management Act of 1990; 25 USC Chapter 33: the Indian Self-Determination and Education Assistance Act of 1975, as amended; 25 USC § 450 et seq.; and the Tribal Self-Governance Act of 1994, as amended, 25 USC §§ 458aa – 458hh.

Responsibility:

Lead: Assistant Secretary – Policy, Management, and Budget

Support: DOI Assistant Secretaries and Bureau Directors, coordinated with USDA

Target to Complete: Ongoing

Section 7(b) i. – Integrated Response Plans

Issue Description/Overview

Design and implement comprehensive, integrated fire response plans for the FIAT areas and other Great Basin areas that prioritize protection of low resilience landscapes most at-risk to detrimental impacts of fire and invasive species.

These actions are required to further a risk-based, cross-boundary approach to rangeland fire response planning and preparedness. Rangeland fire suppression priorities identified by the Order will be incorporated into revised Fire Management Plans (FMPs) and updated computer-aided dispatch (CAD) systems; availability of technology and technology transfer to wildland fire managers will be increased; and initial attack capacity and capability in the FIAT designated states (Idaho, Nevada, Oregon, California, and Utah) will be enhanced. These longer-term actions build on those identified in the Initial Report for implementation during 2015 (see Appendix B).

Action Item #1

Update Fire Management Plans to enhance protection of the sagebrush-steppe from wildfire. Updated plans will include consideration of areas and suppression objectives identified in the FIAT process, as well as reflect land management objectives.

Responsibility:

Co-Leads: DOI Bureau Fire Executives

Support: Local Unit Fire Management Officers in BLM, NPS, BIA, and FWS

Target to Complete: Second Quarter 2016 for FIAT areas; Second Quarter 2017 outside FIAT areas

Action Item #2

Develop a national technology plan to increase the availability of technology and technology transfer to wildland fire managers. Develop a national plan, including implementation guidance, for improving access to real time maps, information, and data by local fire management organizations.

Responsibility:

Lead: Fire Management Board

Support: DOI and USFS Chief Information Officers (CIOs) and Bureau Assistant Directors for Information Resources (IR)

Target to Complete: Second Quarter 2016

Action Item #3

Strengthen rapid and long-term response capabilities and capacity in priority greater sage-grouse habitat, particularly in identified FIAT areas. Each bureau will conduct an assessment to identify the best mix of, and as needed, increases in firefighting assets including equipment such as dozers, engines and aircraft, and people, such as veteran fire crews. The first priority would be to increase initial attack capability, followed by increasing long-term capacity to address other rangeland fire management needs.

Responsibility:

Lead: DOI Bureau Fire Executives

Target to Complete: Second Quarter 2016

Action Item #4

Develop a long-term national plan for enhancing capability, capacity, and utilization of non-Federal wildland fire assets and organizations. This plan will include increasing the capability and capacity of tribal, state, and local agencies as well as rural or local fire departments and RFPAs, to enhance the ability of communities to provide local protection. This plan will also identify opportunities within existing and future Federal wildland fire management budgets to expand capacities and capabilities to support enhancing local efforts to reduce wildfire risk in priority sagebrush-steppe areas, with a goal to create fire-adapted communities and augment Federal protection responsibilities. Examples of expanded capabilities include mandatory training, equipment, and technical assistance.

Responsibility:

Co-Leads: Director, Office of Wildland Fire (OWF) and USFS Director, Fire and Aviation Management (FAM)

Support: **DOI** Bureau and USFS Fire Executives and USFA

Target to Complete: Second Quarter 2016

Section 7(b) ii. – Prioritization and Allocation of Resources

Issue Description/Overview

Provide clear direction on the prioritization and allocation of fire management resources and assets. These actions are required to improve utilization of fire management resources and assets in relation to rangeland fire, increase efficiency, and reduce costs. These actions build on those implemented during 2015, as identified in the Initial Report (see Appendix B).

Action Item #1

Identify and take actions to reduce administrative barriers that adversely affect the mobility of firefighting assets. Identify barriers (e.g., the lack of a travel credit card for fire crews limits the expeditious assignment and reassignment of fire personnel resources from one incident to another) and propose recommended solutions.

Responsibility:

Co-Leads: Director, OWF and Director, USFS (FAM)

Support: **DOI** Bureau Fire Executives, USFA; and National Association of State Foresters (NASF); DOI and USFS business and financial management offices

Target to Complete: Second Quarter 2016

Action Item #2

Enhance predictive services and fire intelligence capabilities to anticipate, plan for, and utilize firefighting resources and assets. Develop and enhance tools to determine and understand expected rangeland fire conditions (e.g., weather and fuels). Improve analytical ability to acquire, pre-position, and mobilize firefighting assets to effectively prepare for and respond to the increased threat from unwanted wildland fire, with priority given to rangeland areas.

Responsibility:

Co-Leads: Director, OWF and Director, USFS FAM

Support: Fire Management Board, National Weather Service, and non-federal partners, including states

Target to Complete: Second Quarter 2016, with additional enhancements in future years

Action Item #3

Engage international and Department of Defense (DOD) partners. Update and strengthen existing arrangements to utilize skills, assets, capabilities, and build capacity with international and DOD partners to supplement domestic Federal and non-federal wildland firefighting capabilities. Complete and implement updated international agreements with Mexico, Australia, and Canada. Review, update, and expand agreements and protocols with DOD to utilize a wide range of capabilities including information and intelligence gathering and analysis, ground and aviation assets, and personnel.

Responsibility:

Co-Leads: Director, OWF and Director, USFS FAM

Support: DOI International Affairs and USFS International Fire

Target to Complete:

- International Agreements: Fourth Quarter 2015
- DOD Agreements: Second Quarter 2016

Action Item #4

Review cooperative agreements between Federal, tribal, and state entities. Review, revise, and update, as necessary, the approach to cooperative wildland fire management agreements. Ensure the utility of those agreements to provide interagency wildland firefighting assets to address priorities including consideration of areas and suppression priorities identified in the FIAT process.

Responsibility:

Co-Leads: Director, OWF and Director, USFS FAM

***Support:* DOI** Bureau Fire Executives; Chair, Forest Fire Protection Committee, NASF

Target to Complete: Second Quarter 2016

Action Item #5

Improve management of the radio spectrum. Develop mechanisms for better management and allocation of radio spectrum during peak use.

Responsibility:

***Co-Leads*:** Director, OWF and Director, USFS FAM

Support: DOI and USFS CIOs, Bureau Assistant Directors for IR, DOI Bureau Fire Executives

Target to Complete: Second Quarter 2016

Action Item #6

Support efforts to identify responsibility for protecting all lands. Provide technical advice and other assistance to state and local governments to define responsibility for those lands that currently lack wildland fire protection.

Responsibility:

Co-Leads: Director, OWF and Director, USFS FAM

Support: Bureau state and regional Fire Management Officers

Target to Complete: Ongoing

Action Item #7

Develop mechanisms to capture and analyze data regarding allocation of firefighting assets and wildfire impacts to priority sagebrush-steppe ecosystems. Develop mechanisms to improve collection, analysis, and use of information to (1) allocate and prioritize firefighting resources and (2) understand the impacts of wildland fire on greater sage-grouse habitat and populations, in order to ensure appropriate prioritization and allocation of firefighting assets to mitigate these threats to critical natural resource values. This includes revisions to the existing Incident Status Summary (ICS 209) and the Incident Management Situation Report (SIT Report).

Responsibility:

Co-Leads: Director, OWF and Director, USFS FAM

Support: DOI Bureau and USFS Resource and Fire Executives, US Fire Administration, National Association of State Foresters, and Fire Management Board

Target to Complete: Second Quarter 2016

Section 7(b) iii. – Fuels

Issue Description/Overview

Improve targeting of fuels reduction opportunities and implementation. These actions are required to achieve efficiencies, promote collaboration, and eliminate existing barriers in fuels management actions. These actions support the need for increased capacity, staffing, and funding to continue to implement risk based projects at the local and landscape-scale that will ultimately lead to increased health of our Nation's sagebrush-steppe ecosystem. These actions build on those implemented during 2015, as identified in the Initial Report (see also Appendix B).

The following collaborative efforts that address fuel treatments serve as the building blocks for many of the proposed actions identified below: *The National Cohesive Wildland Fire Management Strategy*; DOI's Landscape Conservation Cooperatives [LCCs] and Resilient Landscapes [RL]; USFS's Collaborative Forest Landscape Restoration Program [CFLRP]; BLM's Healthy Lands and FIAT; and The Nature Conservancy's Fire Learning Networks

[FLNs]). The 2014 passage of The Farm Bill also includes the Good Neighbor Authority that provides for restoration work to occur across Federal and state boundaries.

Action Item #1

Identify fuels management priorities. Identify priority landscapes and fuels management priorities within landscapes. Land management agencies will collaboratively develop consistent criteria across jurisdictions to prioritize landscapes, and expedite planning and implementation of fuel treatments, particularly in the FIAT assessment areas.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning and Assistant Director for Fire and Aviation

Support: USFS, NRCS, FWS, state agencies, counties, and private landowners

Target to Complete: Third Quarter 2015, continued improvements in subsequent years

Action Item #2

Develop common interagency metrics to validate fuels management activities in sagebrush-steppe. Metrics should be (1) consistent with those developed for monitoring and evaluation of greater sage-grouse land use plans and implementation of adaptive management strategy; (2) science-based (see *Joint Fire Science Program (JFSP) Fuel Treatment Science Plan*); and (3) incorporated into fuels management effectiveness monitoring to understand how fuel treatments are influencing ecosystem structure, function, and resilience.

Responsibility:

Lead: Director, OWF

Support: Federal land management agencies, USGS, JFSP, interested tribes, and non-federal partners (e.g., states, NGOs, etc.)

Target to Complete: First Quarter 2016

Action Item #3

Review and update current best management practices (BMPs) for rangeland fuels treatments. Review and update BMPs for rangeland fuels treatments to better integrate resistance and resilience concepts, ecological resilience science, and to identify a specific suite of preferred design alternatives for fuel treatments in sagebrush-steppe. The BMPs will specifically consider tribal and cultural values and provide flexibility to adjust practices, as needed, prior to fuels treatments (particularly in pinyon-juniper).

Responsibility:

Lead: BLM Assistant Director for Fire and Aviation

Support: Agency fuels specialists (DOI agencies, USFS, and NRCS fuels managers, wildlife, range/vegetation, research scientists with fuel treatment experience), scientific community representatives, and non-federal partners (WAFWA, Western Governors' Association [WGA] representatives, other NGOs).

Target to Complete: Third Quarter 2016

Action Item #4

Coordinate the development of effective landscape-level fuels treatment plans.

Improvements are needed in: (1) developing better understanding of vegetation dynamics in non-forested systems, (2) developing better characterization of sagebrush-steppe and invasive annual grass fuels, treatment actions, effects, and associated changes in potential fire behavior, (3) linkages between fuels and habitat quality for key species, and (4) developing economic models (such as avoided cost) to describe the cost-effective return of investments. To ensure progress in this arena, develop new, integrated modeling systems, built off current systems or new ones.

a. Initiate a pilot project to test existing tools and/or prototype versions of new tools. An initial pilot project will occur to test Interagency Fuels Treatment – Decision Support System (IFT-DSS).

Responsibility:

Co-Leads: BLM Assistant Director for Fire and Aviation and USFS – Wildland Fire Management Research, Development, and Application (WFMRD&A) initiate pilot project to test Interagency Fuels Treatment – Decision Support System (IFT-DSS)

Support: NRCS, NWCG Interagency Fuels Committee

Target to Complete: Results from initial pilot project by Fourth Quarter 2015; initiate additional pilot project(s) in the First Quarter 2016.

b. Use results from pilot project(s) to make improvements in models and identify appropriate tools for developing strategies for future landscape-level fuel treatments in sagebrush-steppe ecosystems. Coordinate with other agencies and organizations that may develop and lead additional pilot projects.

Responsibility:

Co-Leads: BLM Assistant Director for Fire and Aviation and USFS (WFMRD&A)

Support: NRCS, DOI land management agencies, JFSP, and USFS - National Forest Systems (NFS); scientific and academic communities, NGOs

Target to Complete: Core capabilities developed by end of First Quarter 2016; review completed by end of Third Quarter 2016; and recommendations to the Fire Management Board by end of the First Quarter 2017.

Action Item #5

Implement a comprehensive knowledge transfer program to enhance the fuels management program's role in sagebrush-steppe management.

Develop an integrated fuels management knowledge transfer/training program applicable to interdisciplinary specialists. The program would include best management practices, and science-technology transfer components to increase probability for success.

Responsibility:

Co-Leads: BLM Assistant Director for Fire and Aviation and Assistant Director for Renewable Resources and Planning

Support: USFS and DOI Bureau Fire and Resource Executives working with JFSP and/or NGO/universities to develop training

Target to Complete: Develop training by the Second Quarter 2016 and deliver in 2017.

Action Item #6

Explore opportunities to provide support to livestock grazing permittees and private landowners to implement fuel treatment actions as part of strategic, landscape efforts to protect, conserve, and restore sagebrush-steppe habitats. The BLM (and other land management agencies) and NRCS will collaboratively identify priority landscapes where NRCS Sage-Grouse Initiative targets technical and financial assistance on private lands to complement public land fuel treatments to address threats effectively.

Responsibility:

Co-Leads: BLM Assistant Director for Renewable Resources and Planning and NRCS

Support: BLM Assistant Director for Fire and Aviation, USFS, Soil and Water Conservation Districts, private landowners, states, counties, and RFPAs

Target to Complete: Identify landscapes by the First Quarter 2016 and fund work for 2017.

Action Item #7

Explore incentives for livestock producers to implement targeted fuels and vegetation treatments.

In response to interest from private landowners and grazing permittees, work with livestock producers to implement fuels treatments on their lands and allotments. For example, development of Candidate Conservation Agreements with Assurances (CCAA) on private lands and the Candidate Conservation Agreements (CCA) for Federal lands that provides livestock grazers, where feasible, with the ability to implement actions (fuel treatments) to reduce threats to greater sage-grouse in sagebrush-steppe habitat voluntarily.

Responsibility:

Co-Leads: BLM Assistant Director for Renewable Resources and Planning and FWS Assistant Director for Ecological Services

Support: Private landowners, states, counties, and RFPAs

Target to Complete: Evaluate opportunities for livestock producer engagement in FIAT areas by First Quarter 2016. Expand assistance/incentives to producers and permittees in priority landscapes in 2016 – 2017.

Action Item #8

Use risk-based, landscape-scale approaches to identify and facilitate investments in fuels treatments in the Great Basin. Risk-based assessments will consider sagebrush-steppe values within priority greater sage-grouse habitat, particularly in FIAT identified areas, will incorporate adaptive management principles, and will be science-based.

a. DOI will use a risk-based approach to allocate program funds to Bureaus.

Responsibility:

Lead: Director, OWF

Support: DOI Bureau Fire Executives

Target of Complete: Complete by the Fourth Quarter 2015 for 2016 and 2017 Bureau funding

b. DOI agencies to apply a risk-based approach to allocate fuels management program funds to units.

Responsibility:

Lead: DOI Bureau Fire Executives

Target to Complete: By Fourth Quarter 2015 for 2016 and 2017 funding

Section 7b (iv). - Integrate Science into Project Design and Implementation

Issue Description/Overview

Use current and emerging traditional and scientific knowledge of ecological resistance and resilience in the development and implementation of fuels management and restoration actions. Use effective adaptive management to ensure that design practices and implementation strategies reflect both emerging scientific findings and knowledge gained from the analysis of past actions.

These actions outline the steps needed to integrate information known about the science of ecological resilience into habitat management plans, fine and coarse fuels management, invasive species control, and landscape restoration design in sage-steppe habitat and ensure the effective use of adaptive management.

Action Item #1

Develop a Conservation and Restoration Strategy for the sagebrush-steppe that considers emerging science, particularly ecological resistance, and resilience in habitat management, fuels treatment and restoration projects. The Conservation and Restoration Strategy (C&R

Strategy) will include a baseline assessment, conceptual models, and other components necessary to provide an overarching strategy for "on the ground" restoration actions in the sagebrush-steppe and provide a foundation for adaptive management and budget prioritization. The C&R Strategy will acknowledge risks to resource treatments and will incorporate geospatial tools and objectives.

The FIAT assessments, regional mitigation strategies, State Wildlife Action Plans, and other appropriately scaled conservation and restoration strategies are the building blocks in the development of the C&R Strategy. They should be used to create a more unified approach that identifies shared objectives and negotiates inconsistencies. The C&R Strategy should include consideration of multiple resource management objectives and change agents including, but not limited to, greater sage-grouse brood rearing habitat, riparian areas, cultural areas; and risks from climate change, fire, invasive species, development, and other change agents. The C&R Strategy will model possible options for implementation of how specific management activities could improve resilience for greater sage-grouse and other sagebrush obligate species at the site and landscape-scales.

Responsibility:

Co-Leads: BLM Assistant Director for Renewable Resources and Planning and Assistant Director Fire and Aviation

Support: Other DOI and USDA agencies, states, tribes, WAFWA, NGOs, and other partners in conservation science and development, and invite stakeholders to participate

Target to Complete: Fourth Quarter 2016

Action Item #2

Identify priority actions for conservation and restoration. The C&R Strategy will guide prioritization and implementation of multi-partner, multi-year restoration and conservation actions and activities, including plant materials development, monitoring, adaptive management, and science prioritization. The C&R Strategy will be coordinated with other ongoing prioritization efforts within the sagebrush-steppe and other elements of the Strategy required by Secretarial Order 3336 to identify priorities for action. These identified priorities will inform budget decisions in the DOI and DOI bureau programs that fund restoration, fuels reduction, invasive species management, habitat improvement, monitoring, and adaptive management. Additionally, these identified priorities may inform priorities for native plant materials development and science.

Responsibility:

Co-Leads: BLM Assistant Director for Renewable Resources and Planning and Assistant Director Fire and Aviation

Support: Other DOI and USDA bureaus, states, tribes, WAFWA, NGOs and other partners in conservation science and development, and invite stakeholders to participate

Target to Complete*:* Fourth Quarter 2016

Action Item #3

Incorporate traditional ecological knowledge into management practices. Review and consider indigenous peoples' historic fire management practices and the outcomes of those practices, particularly with regard to resilient ecosystems. Consult with appropriate tribal members to identify specific ecological changes due to current fire management practices and other factors, and to identify traditional ecological understandings of interest today. Work with the research community to investigate and improve the effectiveness of rangeland fire protection, conservation, and restoration treatments, incorporating traditional ecological knowledge, into the C&R Strategy. Develop measures of success for projects from multiple perspectives and knowledge systems. Define parameters of success from both western science and traditional ecological knowledge. Recognize contributions of tribal partners in final products, publications, and efforts to publicize projects.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: Other DOI and USDA bureaus, states, tribes, WAFWA, NGOs and other partners in conservation science and development, and invite stakeholders to participate

Target to Complete: Fourth Quarter 2016

Section 7(b) v. – Post-Fire Restoration

Issue Description/Overview

Review and update Emergency Stabilization and Burned Area Rehabilitation policies and programs to integrate with long-term restoration activities. These actions will address policy and program changes to existing DOI Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR) policies to improve the allocation and utilization of funds to recognize sagebrush-steppe factors, to integrate ES and BAR funding with other bureau land and resource management funding and programs, to expedite funding, and to maximize success of restoration projects. These actions build on those identified for implementation during 2015, as identified in the Initial Report (see Appendix B). Since issuance of the Initial Report, an interagency team of ES/BAR and resource management program specialists developed proposals to revise, update, and integrate ES/BAR policies and programs and will present these proposals to interagency leadership for approval and implementation in the summer of 2015.

Action Item #1

Review, update, and resolve Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR) policy, procedures, and allocation changes to meet the goals of the Order. Revise ES/BAR policies and program implementation to align with bureau land management and resource management programs and activities to promote long-term restoration and recovery, update prioritization criteria, and incorporate science to promote resistance and resilience.

Lead: Director, OWF

***Support*:** DOI Bureau Fire and Resource Executives

Target to Complete: Third Quarter 2015

Action Item #2

Integrate ES, BAR, and other restoration programs to adhere to ecologically based desired conditions, and develop processes for long-term restoration commitment and maintenance of ES and BAR treatments.

Conduct an assessment to determine how to best integrate ES, BAR, and restoration activities to obtain a desired ecologically based conditions .and revise and update program handbooks and other documents as necessary.

Lead: Director, OWF

***Support*:** DOI Bureau Fire and Resource Executives

Target: Second Quarter, 2016

Action Item #3

Conduct periodic reviews to test efficacy of ES and BAR programs. Conduct periodic reviews to evaluate and simplify processes in applying for, implementing and reporting on ES and BAR projects over time, including refining ES and BAR policies to align with best available ecological restoration science, while considering changes to timelines, funding, planning, prioritization criteria, and other factors.

Lead: Director, OWF

***Support*:** DOI Bureau Fire and Resource Executives

Target to Complete: Third Quarter 2016

Section 7(b) vi. – Commit to Multi-year Investments in Restoration

Issue Description/Overview

Support long-term strategies for the restoration of sagebrush-steppe ecosystems, including consistent long-term monitoring protocols and adaptive management for restored areas.

These actions will organize existing restoration activities better, implement the Conservation and Restoration Strategy, remove administrative and policy barriers to supporting long-term strategies for restoration, and reduce challenges to coordinating with partners. The DOI's commitment to long-term strategies related to restoration, monitoring, and adaptive management would be more meaningful when managed within a larger context of commitment to restoration in the sagebrush-steppe ecosystem.

Action Item #1

Identify, document and map current investments in restoration, monitoring, and adaptive management.

Compile a list of activities and programs that fund restoration, monitoring and adaptive management investments within the sagebrush-steppe ecosystem. Map "hot spots" of restoration activity or investment to help identify trends and opportunities for greater efficiency and leveraging of funds.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: BLM Assistant Directors for Energy, Minerals, and Realty and Fire and Aviation; OWF, other DOI and USDA agencies, states, tribes, WAFWA, and partners in conservation and development.

Target to Complete: First Quarter 2016

Action Item #2

Identify and initiate actions to reduce administrative barriers to fulfilling multi-year commitments to restoration, monitoring, and adaptive management and to collaborating across landscapes.

Review internal DOI and bureau policies that hinder multi-year commitments to restoration, monitoring, and adaptive management, including existing policy that no-year funds be applied to restoration and managed at the bureau or program-level on a single-year basis. Propose and implement changes to policies and procedures that would facilitate multi-year plans for restoration, monitoring, and adaptive management, including those that would facilitate treatment implementation when environmental conditions are favorable, and those that facilitate collaborating across landscapes.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: BLM Assistant Directors for Energy, Minerals, and Realty and Fire and Aviation; OWF, other DOI bureaus, USDA agencies, states, tribes, WAFWA, and partners in conservation and development

Target to Complete: Second Quarter 2016

Action Item #3

Describe lessons learned from existing multi-year investment programs and recommend procedural changes for funding multi-year plans for restoration, monitoring, and adaptive management.

To identify shared objectives and project priorities, aggregate funds, and/or issue contracts (e.g., Utah's Watershed Restoration Initiative), survey regional "brokers" or "coordinators." Review DOI and other Federal agencies for programs that allow for some form of multi-year plan or that fund particular projects through their duration (e.g., Construction and Deferred Maintenance Projects). Report the lessons learned and recommendations.

Responsibility:

Co-Leads: BLM Assistant Director for Renewable Resources and Planning

Support: Other DOI Bureaus and USDA agencies; invite tribes, partners, and stakeholders to participate.

Target to Complete Dates: First Quarter 2016

Action Item #4:

Develop a community of practice for restoration, monitoring, and adaptive management in the sagebrush-steppe ecosystem. Facilitate and support a cross-jurisdictional consortium of agencies, organizations and partners dedicated to implementation of restoration, monitoring, and adaptive management activities leading to a healthy ecosystem.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: BLM Assistant Directors for Energy, Minerals, and Realty and Fire and Aviation; OWF, other DOI bureaus, USDA agencies, states, tribes, WAFWA, and partners in conservation and development

Target to Complete: Fourth Quarter 2016

Action Item #5:

Develop comprehensive policies and consistent funding to implement the Conservation and Restoration Strategy.

Develop a multi-partner, multi-year program of work to implement the C&R Strategy, including monitoring and adaptive management. Include plans to increase continuity of support for specific treatment areas or programs, e.g., Emergency Stabilization (ES) projects and invasive species treatments.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning and Assistant Director for Fire and Aviation

Support: BLM Assistant Director for Energy, Minerals, and Realty; OWF, other DOI bureaus, USDA agencies, states, tribes, WAFWA, and partners in conservation and development

Target to Complete: Fourth Quarter 2016

Section 7(b) vii. – Large-scale Activities to Remove Invasive Non-native Grasses

Issue Description/Overview

Implement large-scale experimental activities to remove cheatgrass and other invasive annual grasses through various tools.

These actions will result in large-scale activities to remove cheatgrass and other invasive annual grasses through various tools beginning in 2015 with full implementation in subsequent years. The goal of large-scale activities is the effective control and restoration of areas dominated by invasive, non-native annual grasses at a rate greater than the rate of the spread.

Action Item #1

Develop a framework for a national invasive species Early Detection and Rapid Response (EDRR) program.

This effort is in response to a directive in the President's Priority Agenda: *Enhancing the Climate Resilience of America's Natural Resources.* It will benefit agencies, states, tribes, and local entities working on EDRR. It will also provide recommendations to operationalize a national EDRR system. It will build on and aim to connect existing programs that identify potentially invasive species that could become abundant, conduct surveys to assess their extent, and take actions to limit their spread.

Responsibility:

Lead: DOI Invasive Species Coordinator

Support: BLM Assistant Director for Renewable Resources and Planning; FWS, NPS, USGS, USFS, NRCS, U.S. Department of Commerce (DOC), Environmental Protection Agency (EPA), and the National Invasive Species Council (NISC), WGA, state agencies, tribes, and NGOs.

Target to Complete: First Quarter 2016

Action Item #2

Conduct large-scale research and demonstration projects for control of cheatgrass and other invasive annual grasses to identify and advance effective strategies for preventing the spread of invasive species and support large-scale rangeland restoration. Researchers and managers locate and coordinate installation of long-term studies and subsequent monitoring to test the efficacy of large-scale application of integrated pest management programs that include chemical, mechanical, biological, newly registered biocides, and subsequent restoration practices. The program of work would identify suitable locations and process to solicit and review proposals.

Responsibility:

Co-Leads: BLM Assistant Director for Renewable Resources and Planning and Assistant Director for Fire and Aviation; and USGS Associate Director for Ecosystems

Support: FWS, BIA, NPS, USFS, NRCS, ARS, NGOs, tribes, and GBLCC

Target to Complete: Third Quarter 2016

Action Item #3

Complete the Vegetation Treatments Programmatic Environmental Impact Statement (PEIS). The PEIS serves as the working document for the use of herbicides, chemical pesticides, and biocides on lands managed by BLM.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Target to Complete: Fourth Quarter 2016

Action Item #4

Develop a process to coordinate with the Animal and Plant Health Inspection Service (APHIS) and EPA on registration and labeling of new invasive annual grass biological and chemical control agents, as applicable. A structured and scheduled interaction with both APHIS and EPA would occur to discuss options associated with the management of invasive annual grasses. This would allow the agencies to keep current on the options available for consideration in the management of invasive annual grasses.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: USGS, USFS, APHIS, Agricultural Research Service (ARS), and EPA

Target to Complete: Fourth Quarter 2015

Action Item #5

Develop scalable and adaptive grazing management plans for reducing invasive annual grass and other fine fuels through targeted livestock grazing methods to diminish fire risk in priority greater sage-grouse areas to meet greater sage-grouse habitat goals. For example, during seasons with above-normal winter and spring rainfalls, utilize more targeted grazing methods to reduce fine fuels adjacent to priority habitats. Targeted grazing would be a cooperative engagement on both private and Federal lands.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: NRCS, FWS, USFS, ARS, states, counties, grazing permittees, and private landowners

Target to Complete: Agreements and standards in place for use by Third Quarter 2017

Section 7(b) viii. – Science and Research

Issue Description/Overview

Commit to multi-year investments in science and research.

Although a large body of scientific information exists for the sagebrush-steppe ecosystem, key gaps in knowledge remain. A multi-year plan for science and research will provide a basis for an integrated approach to identifying, prioritizing, and funding science and research activities necessary to support this Strategy. The plan will include approaches to ensure science and research is synthesized and accessible for use by managers and contributes to a comprehensive and landscape-level understanding of the sagebrush-steppe ecosystem. Focus areas for science will include:

- Resistance and resilience concepts and thresholds
- Effective and efficient landscape-scale restoration methods, considering regional and site-specific conditions, degree of degradation, major threats, and other factors
- Native and appropriate non-native seeds and plant materials
- Vegetation treatment techniques and effectiveness monitoring (e.g., fuels management, grazing, restoration, invasive annual grass control)
- Wildland fire impacts to native plant communities
- Implications of climate change, grazing and other land uses

Action Item #1

Develop and maintain an inventory of research commitments and capacity. In order to have a better understanding of ongoing research commitments and capacity, Federal agencies will maintain an annual, ongoing inventory of funded research beginning in FY 2015.

Responsibility:

Lead: DOI Science Advisor

Support: USGS, BLM, FWS, NPS, USFS, NRCS, ARS, JFSP, and GBLCC

Target to Complete: Third Quarter 2015 and ongoing

Action Item #2

Review existing research prioritization and strategy efforts to identify science needs for the Great Basin. In the past two years, Federal and state agencies made considerable strides in identifying and prioritizing science needs. These needs included (1) suppressing rangeland fire and controlling invasive plants, and (2) restoring sagebrush-steppe for the benefit of the greater sage-grouse and other priority wildlife species (e.g., USGS Greater Sage-Grouse National Research Strategy; USFS draft Sage-Grouse Conservation Science Strategy; JFSP Fuel Treatment Science Plan; and WAFWA reports: Fire and Fuels Management Contributions to Sage-Grouse

Conservation, Wildfire and Invasive Species in the West: Challenges that Hinder Current and Future Management and Protection of the Sagebrush-steppe Ecosystem—A Gap Report, and Invasive Plant Management and Greater Sage-grouse Conservation Report,). These completed and ongoing efforts will serve as the foundation to identify information gaps and extract science needs focused on fire and invasive plants.

Responsibility:

Lead: USGS Associate Director for Ecosystems

Support: Appropriate Federal agencies, JFSP, and GBLCC

Target to Complete: Fourth Quarter 2015

Action Item #3

Develop an actionable science plan of prioritized research needs. Building on the science needs in Action Item #2, develop a science action plan that prioritizes science needs, and identifies specific research efforts and associated costs and timelines.

Responsibility:

Co-Leads: USGS Associate Director for Ecosystems and USFS Deputy Chief for Research and Development

Support: Interagency team of appropriate Federal, state, tribal, academic, JFSP, and GBLCC representatives

Target to Complete: Third Quarter 2016

Action Item #4

Develop or identify a primary online science delivery system to allow easier access to published science products and other science information. The Great Basin Fire Science Exchange (GB Exchange) funded by the Joint Fire Science Program (JFSP), will be expanded to serve as the primary delivery system for science information for the management and science community. The GB Exchange will compile relevant scientific information, identify gaps in archived information, update and maintain existing websites, provide active links (e.g., GBLCC, GBRMP) to facilitate transfer of relevant scientific information, and develop science syntheses, tools, and services (e.g., training) to increase understanding and use of science in management decisions.

Responsibility:

Co-Leads: JFSP/GBLCC

Support: Other information providers, affected Federal and state agencies, tribes, and NGOs.

Target to Complete: Fourth Quarter 2015

Action Item #5

Identify available funding sources to support the action plan and implement new research in 2017 and beyond. As part of a comprehensive science action plan, DOI and bureaus will plan for its implementation through a commitment to long-term strategies to support science priorities. These priorities include field-based testing and adaptive management and monitoring in ensuring the durability of the action plan.

Responsibility:

Lead: DOI Science Advisor

Support: Other Federal agencies, tribes, GBLCC, JFSP, and DOI Science Coordinator

Target to Complete: Third Quarter 2016 for budget plan development, re-occurring for out-year budget requests

Action Item #6

Conduct periodic reviews and updates of the science action plan. These reviews, conducted at least once every three years, will identify emerging science and determine if new technological innovations have arisen to support management priorities.

Responsibility:

Lead: USGS Associate Director for Ecosystems

Support: Interagency team of appropriate Federal, state, tribal, academic, JFSP, and GBLCC representatives

Target to Complete: Re-occurring with first update in 2019

Section 7(b) ix. – Seed Strategy

Issue Description/Overview

Develop a comprehensive strategy for acquisition, storage, and distribution of seeds and other plant materials. These actions will facilitate the development of a reliable supply of genetically appropriate and locally adapted seed, as well as seeding technology and equipment for successful and expanded effective restoration of the sagebrush-steppe ecosystem, including both native and non-native materials. These longer-term actions build on those identified for implementation during 2015, as identified in the Initial Report (see also Appendix B).

Action Item #1

Complete and issue the National Seed Strategy and Implementation Plan (2015 – 2020) to increase production, storage capacity, acquisition, and use of genetically appropriate and locally adapted seed.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: BIA, FWS, NPS, and USGS; USDA (USFS, NRCS, ARS, National Institute of Food and Agriculture [NIFA]); DOT Federal Highway Administration (FHWA); Smithsonian; and U.S. Botanical Garden

Target to Complete: Fourth Quarter 2015

Action Item #2

Implement the National Seed Strategy. This includes developing a budget and business plan to accomplish the strategy, providing training for managers when making decisions about the selection of genetically appropriate plant materials and technologies for vegetation restoration, propagation, and conservation of culturally important (first food) species, establish pilot training/demonstration projects and solicit scientific research as needed.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning in coordination with the Federal Native Plant Conservation Committee of the Plant Conservation Alliance

Support: BIA, FWS, NPS, and USGS; USDA (USFS, NRCS, ARS, NIFA); DOT FHWA; Smithsonian; U.S. Botanical Garden; and private entities

Target to Complete: Fourth Quarter 2016

Action Item #3

Increase the availability of native seed and plant materials by ensuring the collection, production, storage, and distribution of commercial seed for long-term rangeland conservation in collaboration with private partners. Collect native seed from across the distribution of the species for use in developing commercial seed and for long-term seed banking to ensure conservation of germplasm to promote climate resilience and long-term rangeland health.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: BIA, FWS, NPS, and USGS; USDA (USFS, NRCS, ARS, NIFA); DOT FHWA; Smithsonian; U.S. Botanical Garden; and private parties

Target to Complete: Fourth Quarter 2015 and ongoing

Action Item #4

Coordinate and collaborate across agencies on climate trend data as it relates to seeds. Understand the trends in climate, across the Western United States with a focus on sagebrush-steppe and pinyon-juniper ecosystems.

Responsibility:

Lead: USGS Associate Director for Climate Change and Land Use

Support: DOI and USDA agencies; state agencies, tribes, scientific and academic institutions, and NGOs

Target to Complete: Fourth Quarter 2015 and ongoing

Action Item #5

Increase the availability of native seed and plant materials for the Great Basin. Increase seed production and the grow-out of genetically appropriate native plant species for the restoration of the sagebrush-steppe ecosystem within the Great Basin, which will provide necessary structure and habitat, as well as dietary and other benefits for the greater sage-grouse.

Responsibility:

Lead: BLM Assistant Director for Renewable Resources and Planning

Support: BIA, FWS, NPS; USDA (USFS, NRCS, ARS, NIFA), and Great Basin Native Plant Project

Target to Complete: Fourth Quarter 2015 and ongoing

Action Item #6

Work with tribal and agency plant material specialists to improve efficiencies in rangeland seeding operations for restoration that includes Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR). Agencies will work with rangeland plant material specialists and research to determine how to improve treatment efficiencies while improving monitoring and evaluation of treatment effectiveness, including the National Seed Strategy and Implementation Plan (2015-2020) once final, adaptive management, and engaging research.

Responsibility:

Lead: USGS Associate Director for Ecosystems on developing design and monitoring protocols; Implementation by DOI bureaus

Target to Complete: Fourth Quarter 2016

Action Item #7

Expand efforts to utilize native and non-native seed and vegetation plantings, where appropriate, to accelerate efforts to improve and restore post-fire rangeland health. The Post-Wildfire Handbook and other restoration guidance will incorporate concepts from the National Seed Strategy and Implementation Plan (2015-2020) when completed to identify opportunities to improve rangeland health.

Responsibility:

Lead: Interagency Burned Area Emergency Rehabilitation Team

Support: DOI Bureaus

Target to Complete: Second Quarter 2016

Appendix B – Table of Action Items[7]

A Total Set of Action Items

Initial Report Action Items (Short-Term)

INITIAL REPORT ACTION ITEMS (SHORT TERM)		
Action Item	**Responsible Party/Parties**	**Target to Complete**
Develop and share a geospatial tool that highlights areas of concern in the Great Basin and includes, at a minimum, focal, Fire and Invasives Assessment Tool (FIAT) and Priority Habitat Management areas.	BLM/USGS	May 1, 2015
7(b) i Integrated Response Plans		
#1. Increase the capabilities of rural/volunteer fire departments and RFPAs and enhance the development and use of veterans crews.	OWF/Agency Fire Leadership	June 1, 2015
#2. Ensure local, MAC groups function, and MAC plans are updated.	MAC groups working with local Federal wildland fire suppression agencies, tribes state fire suppression agencies, RFPAs, local fire departments, and other cooperators	May 1, 2015

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[7] Quarters are defined as calendar year (e.g., first quarter ends March 31; second quarter ends June 30; third quarter ends September 30, and fourth quarter ends December 31 each year).

INITIAL REPORT ACTION ITEMS (SHORT TERM)

Action Item	Responsible Party/Parties	Target to Complete
#3. Develop and implement minimum draw down level and step up plans to ensure availability of resources for protection in priority greater sage grouse habitat.	Federal local unit FMOs, in coordination with cooperators and reviewed by Federal state/regional FMOs	May 1, 2015
#4. Apply a coordinated risk based approach to wildfire response to assure initial attack response to priority areas.	Local MAC groups and unit FMOs, with review by Federal regional/state FMOs	May 1, 2015
#5. Develop a standardized set of briefing materials.	Geographic Area Coordinating Groups (GACGs) and local MACs	May 1, 2015
#6. Review/update local plans and agreements for consistency and currency to ensure initial attack response to priority greater sage grouse areas.	Federal local unit FMOs in coordination with cooperators and with review by Federal regional/state FMOs	May 15, 2015
#7. Develop supplemental guidance for use of "severity funding."	DOI OWF in coordination with BLM	May 15, 2015
#8. Evaluate the effectiveness of action plans.	DOIOWF and Federal Agency Fire Directors	May 30, 2015
#9. Increase the availability of technology and technology transfer to fire management managers and suppression resources.	DOI national bureau leadership; DOI state/ regional and local unit managers	June 1, 2015
#10. Improve the description and awareness of critical resource values threatened in various stages of the fire response process including large fire management.	NMAC Group, National Interagency Coordination Center, and Geographic Area Coordination Centers	June 1, 2015

INITIAL REPORT ACTION ITEMS (SHORT TERM)

Action Item	Responsible Party/Parties	Target to Complete
#11. Ensure compliance and evaluation of the implementation plan action items.	Local Unit FMO and Federal regional/ state FMOs	July 1, 2015
7(b) ii Prioritization and Allocation of Resources		
#1. Communication Plan	National Agency Fire Leadership (DOI Bureaus and USFS)	April 1, 2015
#2. Review and update the delegation of authority for the NMAC Group.	National agency leadership (DOI Bureaus/USFS/NASF)	May 1, 2015
#3. Issue national level "Leaders' Intent."	National agency leadership (DOI Bureaus/USFS/NASF)	May 1, 2015
#4. Engage GMAC Groups.	National agency leadership (DOI/USFS/NASF)	May 1, 2015
#5. Develop "Delegation of Authority" template for use by local line officers.	NMAC	May 1, 2015
#6. Engage line officers to communicate Leaders' Intent and expectations.	Federal agency leadership (USFS/DOI Bureaus)	June 1, 2015

INITIAL REPORT ACTION ITEMS (SHORT TERM)

Action Item	Responsible Party/Parties	Target to Complete
7(b) v Post Fire Recovery		
#1. Review and update ES and BAR policy guidance to address rating and evaluation criteria, project design to promote the likelihood of treatment success, cost containment, monitoring, and continuity and transition to long term restoration activities and treatments.	I-BAER/OWF/IFEC/FEC/Federal Fire Policy Council	June 1, 2015
#2. Address acquisition, financial management, and other procedures that pose challenges to timely project implementation.	OWF/Bureau Designated Representatives	July 1, 2015
#3. Accelerate schedule approving BAR projects consistent with the guidelines established for the 2015 fire season.	IBAER/DOI Bureaus	June 1, 2015
#4. Identify non fire programs and activities that will fund treatments and restoration activities for the long term in conjunction with BAR and ES policy and program review to be conducted in 2015.	All Affected DOI Bureaus	June 1, 2015
#5. Identify requirements for NFPORS capabilities.	IBEAR/DOI Bureau	June 1, 2015

INITIAL REPORT ACTION ITEMS (SHORT TERM)

Action Item	Responsible Party/Parties	Target to Complete
7(b) ix Seed Strategy		
#1. Develop the draft National Seed Strategy and Implementation Plan (2015 2020)	BLM (lead agency) BIA, FHA, USFS, FWS, NPS, ARS, NRCS, NIFA, and USGS (support agencies)	April 2015
#2. Identify a forum to discuss and highlight current native seed and restoration techniques and research.	BLM and USFS	April 2015
#3. Provide an opportunity to discuss current research, case studies, and tools that inform applied restoration opportunities in the Great Basin.	BLM and USFS Great Basin Native Plant Project, Society for Ecological Restoration, and Fire Science Exchange	May 2015

Final Report Actions (Longer Term)

FINAL REPORT ACTION ITEMS (LONGER-TERM)		
Action Item	**Responsible Party/Parties**	**Target to Complete**
Cross Cut Items		
#1. Develop interagency capability and functionality to provide ongoing coordination, oversight, and accountability to ensure timely and appropriate implementation of the Strategy and the supporting action items.	Rangeland Fire Task Force (Lead)	Third Quarter 2015; Ongoing
#2. Develop and share a geospatial tool that highlights areas of concern and priority habitats in the Great Basin, including within priority greater sage grouse habitat, particularly in areas identified using the Fire and Invasives Assessment Tool (FIAT).	USGS Associate Director for Core Science Systems (Lead) BLM AD for Fire and Aviation Dept. Geospatial Information Officer BLM AD for Renewable Resources and Planning (Support)	Third Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#3. Establish an interagency framework with protocols, standards, and capacity to conduct long and short term monitoring at all appropriate scales, of the sagebrush steppe ecosystem condition and the effectiveness of fire prevention, fire suppression, and habitat restoration. Use adaptive management to respond to changing conditions, guide new science, and adjust management practices and policy.	USGS AD for Ecosystems for development of monitoring framework and BLM AD for Renewable Resources and Planning for field implementation of monitoring (Co-Leads) and USFS and other appropriate Federal and state agencies and tribes	Fourth Quarter 2016
#4. Develop and implement efficient and appropriate National Environmental Policy Act (NEPA) and other environmental compliance processes.	Office of the Secretary – Assistant Secretary – Policy, Management, and Budget and Assistant Secretary – Land and Minerals Management (Co-Leads) Support: BLM, FWS, BIA, NPS, and other supporting agencies	Third Quarter 2015 to develop process, including schedule for implementation

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#5. Develop multi year resource and action plan to implement the Strategy and supporting actions and develop tools to facilitate integrated budget development and track implementation.	Assistant Secretary – Policy, Management, and Budget (Lead) DOI Assistant Secretaries and Bureau Directors, in coordination with USDA (Support)	Ongoing
#6. Enhance Funding Leverage and Collaboration with Partners.	Assistant Secretary – Policy, Management, and Budget (Lead) DOI Assistant Secretaries and Bureau Directors, in coordination with USDA (Support)	Ongoing
7(b) i. Integrated Response Plans		
#1. Update Fire Management Plans to enhance protection of the sagebrush steppe from wildfire.	DOI Bureau Fire Executives (Co-Leads) Local Unit Fire Management Officers – BLM, NPS, BIA, and FWS (Support)	Second Quarter 2016 for FIAT Areas Second Quarter 2017 outside FIAT Areas
#2. Develop a national technology plan to increase the availability of technology and technology transfer to wildland fire managers.	Fire Management Board (Lead) DOI and USFS Chief Information Officers (CIOs) and Bureau ADs for Information	Second Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
	Resources (IR) (Support)	
#3. Strengthen rapid and long term response capabilities and capacity in priority greater sage grouse habitat, particularly in identified FIAT areas.	DOI Bureau Fire Executives (Lead)	Second Quarter 2016
#4. Develop a long term national plan for enhancing capability, capacity, and utilization of non federal wildland fire assets and organizations.	Director, Office of Wildland Fire (OWF); Director, USFS Fire and Aviation Management (FAM) (Co-Leads) DOI Bureau and USFS Fire Executives; USFA (Support)	Second Quarter 2016
7(b) ii. Prioritization and Allocation of Resources		
#1. Identify and take actions to reduce administrative barriers that adversely affect the mobility of firefighting assets.	Director, OWF; Director, USFS FAM (Co-Leads) DOI Bureau Fire Executives, USFA, and NASF; DOI and USFS business and financial management offices (Support)	Second Quarter 2016
#2. Enhance predictive services and fire intelligence capabilities to anticipate, plan for, and utilize firefighting resources and assets.	Director, OWF; Director, USFS FAM (Co-Leads) Fire Management Board, National Weather Service, and non-federal partners, including states	Second Quarter 2016, with additional enhancements in future years

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
	(Support)	
#3. Engage international and Department of Defense (DOD) partners.	Director, OWF; Director, USFS FAM (Co-Leads) DOI International Affairs and USFS International Fire (Support)	International Agreements: Fourth Quarter 2015 DOD Agreements: Second Quarter 2016
#4. Review cooperative agreements between Federal, tribal, and state entities.	Director, OWF; Director, USFS FAM (Co-Leads) DOI Bureau Fire Executives; Chair, Forest Fire Protection Committee, NASF (Support)	Second Quarter 2016
#5. Improve management of the radio spectrum.	Director, OWF; Director USFS FAM (Co-Leads) DOI and USFS CIOs, Bureau ADs for IR, DOI Bureau Fire Executives (Support)	Second Quarter 2016
#6. Support efforts to identify responsibility for protecting all lands.	Director, OWF; Director USFS FAM (Co-Leads) Bureau state and regional Fire Management Officers (Support)	Ongoing
#7. Develop mechanisms to capture and analyze data regarding allocation of firefighting assets and wildfire impacts to priority sagebrush steppe ecosystems.	Director, OWF; Director, USFS FAM (Co-Leads) DOI Bureau and USFS Resource and Fire Executives, USFA, and NASF; and Fire Management Board (Support)	Second Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
7(b) iii. Fuels		
#1. Identify fuels management priorities.	BLM ADs for Renewable Resources and Planning and Fire and Aviation (Co-Leads) USFS, NRSC, FWS, state agencies, counties and private landowners (Support)	Third Quarter 2015, continued improvements in subsequent years
#2. Develop common interagency metrics to validate fuels management activities in sagebrush steppe.	Director, OWF (Lead) Federal land management agencies, USGS, JFSP, interested tribes, and non-federal partners (e.g., states, NGOs, etc.) (Support)	First Quarter 2016
#3. Review and update current best management practices (BMPs) for rangeland fuel treatments.	BLM AD for Fire and Aviation (Lead) Agency fuels specialists (DOI, USFS, NRCS), wildlife, range/vegetation, research scientists with fuel treatment experience, scientific community representatives, and non-federal partners (WAFWA, WGA representatives, and other NGOs) (Support)	Third Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#4. Coordinate the development of effective landscape level fuel treatment plans. ***4a. Initiate a pilot project to test existing tools and/or prototype versions of new tools. An initial pilot project will occur to test Interagency Fuels Treatment Decision Support System (IFT DSS).***	BLM AD for Fire and Aviation; USFS Wildland Fire Management Research, Development, and Application (WFMRD&A) (Co-Leads) NRCS, NWCG Interagency Fuels Committee (Support)	Results from initial pilot project by Fourth Quarter 2015; initiate additional pilot project(s) in the First Quarter of 2016
4b. Use results from pilot project(s) to make improvements in models and identify appropriate tools for developing strategies for future landscape level fuel treatments in sagebrush steppe ecosystems. Coordinate with other agencies and organizations that may develop and lead additional pilot projects.	BLM AD Fire and Aviation and USFS WFMRD&A (Co-Leads) NRCS, DOI land management agencies, JFSP, and USFS National Forest Systems (NFS); scientific and academic communities, NGOs (Support)	Core capabilities developed by the end of the First Quarter 2016; Review completed by end of Third Quarter 2016; and Recommendations to the Fire Management Board by the end of the First Quarter 2017
5. Implement a comprehensive knowledge transfer program to enhance the fuels management program's role in sagebrush steppe management.	BLM AD for Fire and Aviation and BLM AD for Renewable Resources and Planning (Co-Leads) USFS and DOI Bureau Fire and Resource Executives working with JFSP and/or NGO/universities to develop training (Support)	Develop training by Second Quarter 2016; Deliver training in 2017

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
6. Explore opportunities to provide support to livestock grazing permittees and private landowners to implement fuel treatment actions as part of strategic, landscape efforts to protect, conserve, and restore sagebrush steppe habitats.	BLM AD for Renewable Resources and Planning and NRCS (Co-Leads) BLM AD for Fire and Aviation, USFS, Soil and Water Conservation Districts, private landowners, states, counties, and RFPAs (Support)	Identify landscapes by the First Quarter 2016; Fund work for 2017
7. Explore incentives for livestock producers to implement targeted fuel and vegetation treatments.	BLM AD for Renewable Resources and Planning and FWS AD for Ecological Services (Co-Leads) Private landowners, states, counties, and RFPAs (Support)	Evaluate opportunities for livestock producer engagement in FIAT areas by First Quarter 2016; Expand assistance/incentives to producers and permittees in priority landscapes in 2016 – 2017.

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#8. Use risk based, landscape scale approaches to identify and facilitate investments in fuel treatments in the Great Basin. ***a. DOI will use a risk based approach to allocate program funds to Bureaus.*** ***b. DOI agencies to apply a risk based approach to allocate fuels management program funds to units.***	8a. Director OWF (Lead) DOI Bureau Fire Executives (Support) 8b. DOI Bureau Fire Executives (Co-Leads)	8a. Complete by Fourth Quarter of 2015 for 2016 and 2017 8b. By Fourth Quarter 2015 for 2016 and 2017 funding
7(b) iv. Integrate Science into Project Design and Implementation		
#1. Develop a Conservation and Restoration Strategy for the sagebrush steppe that considers emerging science, particularly ecological resistance, and resilience in habitat management, fuels treatment and restoration projects.	BLM ADs for Renewable Resources and Planning and Fire and Aviation (Co-Leads) Other DOI and USDA agencies, states, tribes, WAFWA, NGOs, and other partners in conservation science and development, and invite stakeholders to participate (Support)	Fourth Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#2. Identify priority actions for conservation and restoration.	BLM ADs for Renewable Resources and Planning and Fire and Aviation (Co-Leads) Other DOI and USDA agencies, states, tribes, WAFWA, NGOs, and other partners in conservation science and development, and invite stakeholders to participate (Support)	Fourth Quarter 2016
#3. Incorporate traditional ecological knowledge into management practices.	BLM AD for Renewable Resources and Planning (Lead) Other DOI and USDA agencies, states, tribes, WAFWA, NGOs, and other partners in conservation science and development, and invite stakeholders to participate (Support)	Fourth Quarter 2016
7(b) v. Post Fire Restoration		
#1. Review, update, and resolve Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR) policy, procedures, and allocation changes to meet the goals of the Order.	Director, OWF (Lead) DOI Bureau Fire and Resource Executives (Support)	Third Quarter 2015

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#2. Integrate ES, BAR, and other restoration programs to adhere to ecologically based desired conditions, and develop processes for long term restoration commitment and maintenance of ES and BAR treatments.	Director, OWF (Lead) DOI Bureau Fire and Resource Executives (Support)	Second Quarter, 2016
#3. Conduct periodic reviews to test efficacy of ES and BAR programs.	Director, OWF (Lead) DOI Bureau Fire and Resource Executives (Support)	Third Quarter 2016
7(b) vi. Commit to Multi year Investments in Restoration		
#1. Identify, document and map current investments in restoration, monitoring, and adaptive management.	BLM AD for Renewable Resources and Planning (Lead) BLM ADs for Energy, Minerals, and Realty Management and Fire and Aviation; OWF; other DOI and USDA agencies, states, tribes, WAFWA, and partners in conservation and development (Support)	First Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#2. Identify and initiate actions to reduce administrative barriers to fulfilling multi year commitments to restoration, monitoring, and adaptive management and to collaborating across landscapes.	BLM AD for Renewable Resources and Planning (Lead) BLM ADs for Energy, Minerals, and Realty Management and Fire and Aviation; OWF; other DOI and USDA agencies, states, tribes, WAFWA, and partners in conservation and development (Support)	Second Quarter 2016
#3. Describe lessons learned from existing multi year investment programs and recommend procedural changes for funding multi year plans for restoration, monitoring, and adaptive management.	BLM AD for Renewable Resources and Planning (Lead) Other DOI Bureaus and USDA agencies Invite tribes, partners, and stakeholders to participate (Support)	First Quarter 2016
#4. Develop a community of practice for restoration, monitoring, and adaptive management in the sagebrush steppe ecosystem.	BLM AD for Renewable Resources and Planning (Lead) BLM ADs for Energy, Minerals, and Realty Management and Fire and Aviation; OWF; other DOI and USDA agencies, states, tribes, WAFWA, and partners in conservation and development (Support)	Fourth Quarter 2016
#5. Develop comprehensive policies and consistent funding to implement the Conservation and Restoration Strategy	BLM AD for Renewable Resources and Planning and Fire and Aviation (Co-Leads) BLM ADs for Energy, Minerals, and Realty	Fourth Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
	and Fire and Aviation; OWF; other DOI and USDA agencies, states, tribes, WAFWA, and partners in conservation and development (Support)	
7(b) vii. Large scale Activities to Remove Invasive Non native Grasses		
#1. Develop a framework for a national invasive species Early Detection and Rapid Response (EDRR) program.	DOI Invasive Species Coordinator (Lead) BLM AD for Renewable Resources and Planning; FWS, NPS, USGS, USFS, NRCS, DOC, Environmental Protection Agency (EPA), and National Invasive Species Council (NICS), WGA, state agencies, tribes, and NGOs (Support)	First Quarter 2016
#2. Conduct large scale research and demonstration projects for control of cheatgrass and other invasive annual grasses to identify and advance effective strategies for preventing the spread of invasive species and support large scale rangeland restoration.	BLM ADs for Renewable Resources and Planning and Fire and Aviation; USGS AD for Ecosystems (Co-Leads) FWS, BIA, NPS, USFS, NRCS, ARS, NGOs, tribes, and GBLCC (Support)	Third Quarter 2016

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#3. Complete the Vegetation Treatments Programmatic Environmental Impact Statement.	BLM AD for Renewable Resources and Planning (Lead)	Fourth Quarter 2016
#4. Develop a process to coordinate with the Animal and Plant Health Inspection Service (APHIS) and EPA on registration and labeling of new invasive annual grass biological and chemical control agents, as applicable.	BLM AD for Renewable Resources and Planning (Lead) USGS, USFS, ARS, APHIS, and EPA (Support)	Fourth Quarter 2015
#5. Develop scalable and adaptive grazing management plans for reducing invasive annual grass and other fine fuels through targeted livestock grazing methods to diminish fire risk in priority greater sage grouse areas to meet greater sage grouse habitat goals.	BLM AD for Renewable Resources and Planning (Lead) NRCS, FWS, USFS, ARS, states, counties, grazing permittees, and private landowners (Support)	Agreements and standards in place for use by Third Quarter 2017
7(b) viii. Science and Research		
#1. Develop and maintain an inventory of research commitments and capacity.	DOI Science Advisor (Lead) USGS, BLM, FWS, NPS, USFS, NRCS, ARS, JFSP and GBLCC (Support)	Third Quarter 2015 and Ongoing
#2. Review existing research prioritization and strategy efforts to identify science needs for the Great Basin.	USGS AD for Ecosystems (Lead) Appropriate Federal agencies, JFSP, and GBLCC (Support)	Fourth Quarter 2015

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
#3. Develop an actionable science plan of prioritized research needs.	USGS AD for Ecosystems and USFS Deputy Chief for Research and Development (R&D) (Co-Leads) Interagency team of appropriate Federal, state, tribal, academic, JFSP, and GBLCC representatives (Support)	Third Quarter 2016
#4. Develop or identify a primary online science delivery system to allow easier access to published science products and other science information.	JFSP and GBLCC (Co-Leads) Other information providers, affected Federal and state agencies, tribes, NGOs (Support)	Fourth Quarter 2015
#5. Identify available funding sources to support the action plan and implement new research in 2017 and beyond.	DOI Science Advisor (Lead) Other Federal agencies, tribes, GBLCC, JFSP, and DOI Science Coordinator (Support)	Third Quarter 2016 for budget plan development, re-occurring for out-year budget requests
#6. Conduct periodic reviews and updates of the science action plan.	USGS AD for Ecosystems (Lead) Interagency team of appropriate Federal, state, tribal, academic, JFSP, and GBLCC representatives (Support)	Re-occurring with first update in 2019

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
7(b) ix. Seed Strategy		
#1. Complete and issue the National Seed Strategy and Implementation Plan (2015 2020) to increase production, storage capacity, acquisition, and use of genetically appropriate and locally adapted seed.	BLM AD for Renewable Resources and Planning (Lead) BIA, FWS, NPS, and USGS; USDA (USFS, NRCS, ARS, National Institute of Food and Agriculture [NIFA]); DOT Federal Highway Administration (FHWA); Smithsonian; and U.S. Botanical Garden (Support)	Fourth Quarter 2015
#2. Implement the National Seed Strategy.	BLM AD for Renewable Resources and Planning (Lead) BIA, FWS, NPS, and USGS; USDA (USFS, NRCS, ARS, National Institute of Food and Agriculture [NIFA]); DOT Federal Highway Administration (FHWA); Smithsonian; U.S. Botanical Garden; and private entities (Support)	Fourth Quarter 2016
#3. Increase the availability of native seed and plant materials by ensuring the collection, production, storage, and distribution of commercial seed for long term rangeland conservation in collaboration with private partners.	BLM AD for Renewable Resources and Planning (Lead) BIA, FWS, NPS, and USGS; USDA (USFS, NRCS, ARS, National Institute of Food and Agriculture [NIFA]); DOT Federal Highway Administration (FHWA); Smithsonian; U.S. Botanical Garden and private parties	Fourth Quarter 2015 and ongoing

FINAL REPORT ACTION ITEMS (LONGER-TERM)

Action Item	Responsible Party/Parties	Target to Complete
	(Support)	
#4. Coordinate and collaborate across agencies climate trend data as it relates to seeds.	USGS Associate Director for Climate Change and Land Use (Lead) DOI and USDA agencies; state agencies, tribes, scientific and academic institutions, and NGOs (Support)	Fourth Quarter 2015 and ongoing
#5. Increase the availability of native seed and plant materials for the Great Basin.	BLM AD for Renewable Resources and Planning (Lead) BIA, FWS, NPS; USDA (USFS, NRCS, ARS, National Institute of Food and Agriculture [NIFA]), and Great Basin Native Plant Project (Support)	Fourth Quarter 2015 and ongoing
#6. Work with tribal and agency plant material specialists to improve efficiencies in rangeland seeding operations for restoration that includes Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR).	USGS AD for Ecosystems on developing design and monitoring protocols; Implementation by DOI bureaus (Lead)	Fourth Quarter 2016
#7. Expand efforts to utilize native and non native seed and vegetation plantings, where appropriate, to accelerate efforts to improve and restore post fire rangeland health.	IBAER (Lead) DOI Bureaus (Support)	Second Quarter 2016

Appendix C – Fire and Invasive Assessment Tool (FIAT)

Overview of the FIAT

Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment (Fire and Invasive Assessment Tool, June 2014; (Prepared by Fire and Invasive Assessment Team (Appendix 5), 44 pages).

Introduction and Background

The purpose of the Fire and Invasive Assessment Tool (FIAT) is to identify priority habitat areas and management strategies to reduce the threats to greater sage-grouse resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The Conservation Objectives Team (COT) report (USFWS 2013) and other scientific publications identify wildfire and conversion of sagebrush habitat to invasive annual grass dominated vegetative communities as two of the primary threats to the sustainability of greater sage-grouse (*Centrocercus urophasianus*, hereafter sage-grouse) in the western portion of the species range. For the purposes of this assessment protocol, invasive species are limited to, and hereafter referred to, as invasive annual grasses (e.g., primarily cheatgrass (*Bromus tectorum*)). This assessment also addresses the Conifer expansion (also called encroachment).

The development of the FIAT process was in response to FWS' need for an assurance that DOI would strategically address fire and invasive species on the landscape and tied to the Conservation Objectives Team (COT) Report (FWS 2013). The concept of the FIAT was first presented to the National Policy Team (NPT) at a September 2013 Federal agency meeting. The decision by the NPT from that meeting was to conduct the FIAT (Fire and Invasive Assessment Team) assessments and commissioned a team led by Mike Pellant, BLM, Great Basin Restoration Initiative Coordinator. The final FIAT process report was completed in June 2014, and then the Fire and Invasives Assessment *Teams* evolved into a Fire and Invasives Assessment *Tool* (or Process). Evolution was completed after issuance of BLM Instruction Memorandum (IM) 2014-134 from BLM Assistant Director Resources, and Planning, on August 28, 2014.

The initial analysis is limited to Western Association of Fish and Wildlife Management Agencies' (WAFWA) Management Zones III, IV, and V (roughly the Great Basin region) because of the significant issues associated with invasive annual grasses, conifer expansion, and the high occurrence of wildfires in this region. An interagency team of wildland fire and resource management specialists and research ecologists from BLM, USFS Rocky Mountain Research Station, ARS, USGS, FWS, and NRCS developed the FIAT protocol to specifically incorporate resistance to invasive annual grasses and resilience to disturbance principles into the assessment protocol.

The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers et al. 2014a). The Western Association of Fish and Wildlife Agencies (WAFWA) assembled an interdisciplinary team to address the issues of wildfires and invasive annual grasses. This interagency collaboration between rangeland scientists, fire specialists, and sage-grouse biologists resulted in the development of a strategic, multi-scale approach for employing ecosystem resilience and resistance concepts to manage threats to sage-grouse habitats from wildfire and invasive annual grasses (Chambers et al. 2014b). This paper, published as a Forest Service Rocky Mountain Research Station General Technical Report RMRS-GTR-326, serves as the reference and basis for the FIAT protocol. A paper derived from this GTR is being developed for peer-reviewed publication in a scientific journal.

FIAT Process

The assessment process included two steps with sub-elements:

Step 1

First, important Priority Areas for Conservation (PACs) and focal habitats are identified (Step 1a). Second, potential management strategies are identified to conserve or restore important focal habitats threatened by wildfires, invasive annual grasses, and conifer expansion (primarily pinyon pine and/or juniper species; Step 1b) within focal habitats. Focal habitats are the portions of a PAC with important habitat characteristics that support viable populations of greater sage-grouse, and are at risk due to threats (e.g., wildfires, invasive annual grasses, and conifer expansion). Soil temperature and moisture regimes are used to characterize capacity for resistance to invasive annual grasses and resilience to disturbance (primarily wildfires) within focal habitats and to assist in identifying appropriate management strategies.

Step 2

Step 2 is conducted by local management units to address wildfire, invasive annual grasses, and conifer expansion in or near focal habitat areas. The geospatial data from Step 1 are integrated with more refined local data in Step 2 of the assessment process. By integrating regional findings, refined local data, and resistance/resilience concepts, FIAT step 2 produces a suite of potential treatments and management strategies for sage-grouse conservation. Specifically, these include management opportunities for fuels management, habitat restoration, fire operations, and post-fire rehabilitation. These opportunities are developed in concert with State and Federal partners, and involve management across ownerships.

The Science That Supports FIAT

Greater sage-grouse are considered a landscape species that require very large areas to meet their annual life history needs. Greater sage-grouse are highly clumped in their distribution (Doherty et al. 2010), and the amount of landscape cover in sagebrush is an important predictor of greater sage-grouse persistence in these population centers (Knick 2011). FIAT used data sets that were available across the three management zones as an initial step for prioritizing five large PACs and several smaller adjacent PACs for the first round of FIAT assessments.

Priority Areas for Conservation (PACs) and Breeding Bird Density (BBD)

PACs were developed in the COT Report (USFWS 2013) based on greater sage-grouse habitat requirements and population data and served as the first filter for the assessment. Greater sage-grouse breeding bird densities (BBD) developed by Doherty et al. (2010) were used to identify greater sage-grouse population concentration centers. While this coverage strongly reflects breeding habitats, it also serves as the best regional dataset for portraying greater sage-grouse population abundance. Finer scale seasonal habitat use data was incorporated at local levels (where available) to ensure management actions encompassed all seasonal habitat requirements.

For this assessment, FIAT chose to use the 75 percent BBD as an indicator of high bird density areas and focused management activities in or near these areas in the PACs selected for assessments. Note that breeding density areas displayed in Doherty et al. (2010) were identified using best available information in 2009. Where available, more current BBD data provided by State game and fish agencies were incorporated into FIAT Step 2 assessments. Subsequent analysis should use the most current information available. In addition, BBD areas should not be viewed as rigid boundaries but rather as a means to prioritize landscapes regionally where step down assessments and actions should be implemented quickly to conserve the most birds.

Soil Temperature and Moisture Regimes

In cold desert shrublands, vegetation community resistance to invasive annual grasses and resilience following disturbance is strongly influenced by soil temperature and moisture regimes. Generally, colder soil temperature regimes and moister soil moisture regimes are associated with more resilient and resistant vegetation communities. While vegetation productivity and ability to compete and recover from disturbance increase along a moisture gradient, cooler temperatures limit invasive annual grass growth and reproduction (Chambers et al. 2007; Chambers et al. 2014a). Conversely, warm and dry soil temperature and moisture regimes and to a lesser degree cool and dry soil temperature and moisture regimes, are linked to less resistant and resilient communities that are more likely to be invaded by invasive annual grasses. These relationships can be used to prioritize management actions within sage-grouse habitat using broadly available data.

To capture relative resistance and resilience to disturbance and invasive annual grasses across the landscape, soil temperature and moisture regime information (described in detail in Chambers et al. 2014b) were obtained from the NRCS Soil Survey Geographic Database (SSURGO) data. Where gaps in this coverage existed, the NRCS US General Soil Map (STATSGO2) data were used (Soil Survey Staff 2014a, b).

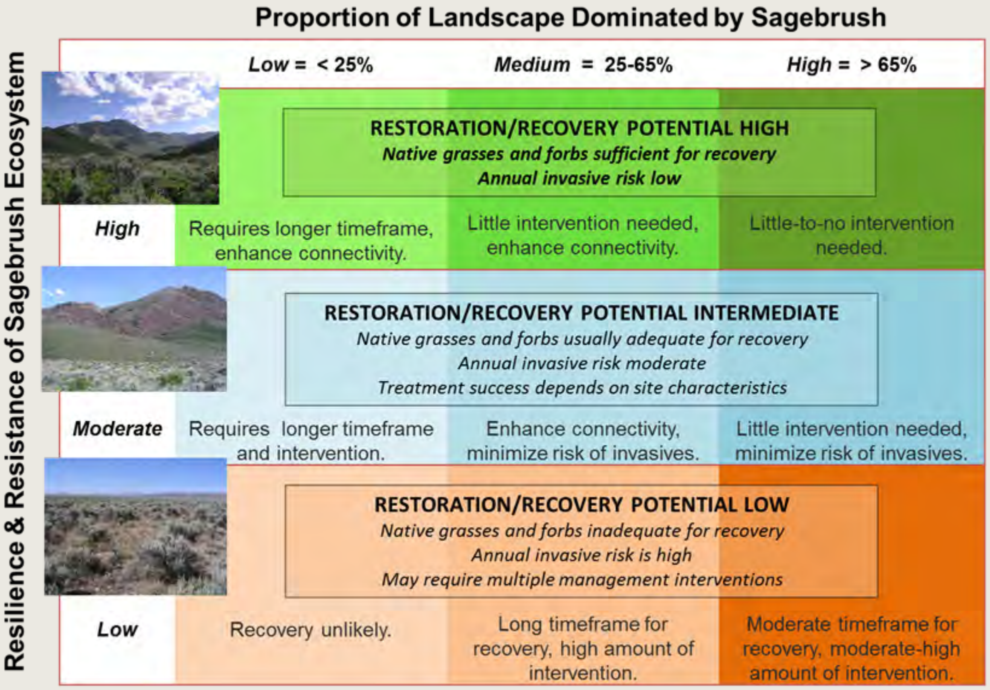
Sagebrush Landscape Cover

The amount of the landscape in sagebrush cover is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape-scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, FIAT used less than or equal to 25 percent sagebrush landscape cover as a level below which there is a low probability of maintaining sage-grouse leks, and greater than or equal to 65 percent as the level above which there is a high probability of sustaining sage-grouse populations with further increases of landscape cover of sagebrush (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). FIAT then grouped the percentage of landscape sagebrush cover into each of the selected categories (0 to 25 percent, 25 to 65 percent, and 65 to 100 percent). These thresholds were used to inform the development of management opportunities in the FIAT assessments.

Putting it All Together: Sage-Grouse Habitat Matrix

The key to the FIAT Assessment is the Sage-Grouse Habitat Matrix (below) which assists managers in prioritizing management activities based on the resistance and resilience of the landscape and the amount of sagebrush landscape cover. Combined with the 75% Breeding Bird Density, managers have the information needed to prioritize areas for fire operations, fuels management, post-fire rehabilitation and habitat restoration and recovery.

Figure C-1. *Matrix designed to link ecosystem resilience and resistance with potential species habitat for sagebrush ecosystems and greater sage-grouse in the western portion of sage-grouse's range. The rows provide information on the restoration/recovery potential of ecological types with relatively high, moderate, and low resilience and resistance and are illustrated here by mountain big sagebrush/mountain brush, mountain big sagebrush, and Wyoming sagebrush, respectively. The columns provide information on the amount of time and types of intervention required to increase sagebrush cover, and the probability of sage-grouse persistence for areas with low (< 25%), medium (25-65%) and high (> 65%) land cover of sagebrush. The management objective is to move from left to right within each resilience and resistance category and increase contiguous land cover of sagebrush (adapted from Chambers et al. 2014b).*



Proportion of Landscape Dominated by Sagebrush

Resilience & Resistance of Sagebrush Ecosystem

	Low **= < 25%**	***Medium*** **= 25-65%**	***High*** **= > 65%**
	RESTORATION/RECOVERY POTENTIAL HIGH ***Native grasses and forbs sufficient for recovery*** ***Annual invasive risk low***		
High	Requires longer timeframe, enhance connectivity.	Little intervention needed, enhance connectivity.	Little-to-no intervention needed.
	RESTORATION/RECOVERY POTENTIAL INTERMEDIATE *Native grasses and forbs usually adequate for recovery* *Annual invasive risk moderate* *Treatment success depends on site characteristics*		
Moderate	Requires longer timeframe and intervention.	Enhance connectivity, minimize risk of invasives.	Little intervention needed, minimize risk of invasives.
	RESTORATION/RECOVERY POTENTIAL LOW *Native grasses and forbs inadequate for recovery* *Annual invasive risk is high* *May require multiple management interventions*		
Low	Recovery unlikely.	Long timeframe for recovery, high amount of intervention.	Moderate timeframe for recovery, moderate-high amount of intervention.

Status of FIAT Assessments

The BLM was the lead agency for the FIAT Step 2 assessments, which were completed on March 27, 2015.

Additional partners contributing to the assessments include USFWS, U.S. Forest Service, Rocky Mountain Research Station, NRCS, and state game and fish agencies. In total, five FIAT assessments are complete for highly valued landscapes, as identified in FIAT step 1. These landscapes correspond to PACs, as outlined in the COT Report (USFWS 2013):

- Central Oregon
- Northern Great Basin
- Snake/Salmon/Beaverhead
- Southern Great Basin
- Western Great Basin / Warm Springs Valley NV, Western Great Basin

In each of these areas, FIAT teams applied guidance from Chambers et al. (2014b), the COT report (USFWS 2013), and additional science to identify management strategies and potential treatments, which ameliorate threats to greater sage-grouse. These management opportunities include fuel breaks, which complement fire suppression efforts; removal of conifer species expanding into greater sage-grouse habitats; treatment of invasive annual grasses and native plant reestablishment; identifying areas for highest fire suppression priority; and prioritizing landscapes for rehabilitation practices when wildfires occur. In addition to the written assessments, spatial data depictions of the location and extent of management opportunities were developed.

In the years ahead, BLM and partner agencies will implement these potential treatments and management strategies, contributing to sage-grouse conservation through habitat improvement, efficient fire suppression, effective post-fire recovery, and projects, which improve firefighter success.

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Appendix D – Wildland Fire Management Overview

An Overview of Wildland Fire Management

Terminology

Wildland fire is any non-structure fire that occurs in vegetation or natural fuels. Wildland fire includes prescribed fire and wildfire. Rangeland fire is wildland fire occurring in rangelands. The term Fire Management includes all activities for the management of wildland fires to meet land management objectives. Fire management includes the entire scope of activities from planning, prevention, fuels or vegetation modification, prescribed fire, hazard mitigation, fire response, rehabilitation, monitoring and evaluation.

Wildland Fire Organizations

The DOI, United States Forest Service, state, tribes, counties, and local governments maintain operational wildland fire organizations. These are supplemented by volunteer organizations such as volunteer fire departments and rangeland protection associations. In DOI, the operational fire organizations reside in Bureau of Land Management (BLM), National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and Bureau of Indian Affairs (BIA). Other organizations such as US Fire Administration (in Department of Homeland Security) and U.S. Geological Survey (USGS) have fire expertise that supports and partners with the operational fire organizations. The Office of Wildland Fire (OWF) at DOI provides budget and policy coordination, leadership, and oversight for the operational programs within DOI.

Wildland Fire Governance

A number of chartered interagency groups exist to provide coordination and consistency among the widland fire organizations to ensure policy and operational consistency and interoperability. Among these are:

- Wildland Fire Leadership Council – policy level coordination and leadership among Federal, state, tribal, and local organizations
- Federal Fire Policy Council – policy leadership among Federal agency heads
- Forest Fire Protection Committee, National Association of State Foresters - policy and program coordination among states
- Fire Executive Committee – policy direction and oversight among Federal fire senior executives
- Fire Management Board – program management and coordination among Federal fire program directors

- National Wildfire Coordinating Group – intergovernmental development of interoperability standards for adoption by individual agencies
- National Multi-Agency Coordination Group – national level intergovernmental allocation and prioritization of firefighting assets
- Geographic Area Multi-Agency Coordination Group – geographic level intergovernmental allocation and prioritization of firefighting assets

Firefighting Assets

Firefighting assets consistent of all those items necessary to conduct wildland fire management activities, including: personnel (permanent, seasonal, contract, agency employees), owned and leased vehicles and equipment (engines, dozers, radios, and so on), owned and leased aircraft (fixed wing, helicopters), supplies, and facilities (fire stations, warehouses, tanker bases, and so on). Each firefighting organization acquires and manages assets within its operational fire program.

Preparedness assets (those already paid for) are placed at locations determined by each organization based on workload, complexity, risk, and similar factors. Assets in excess of immediate local need are available for re-assignment (these are identified in the system as "available"). Re-assignment may be a one-time assignment of an asset to support an incident in a different location or re-assignment could be the relocation of an asset to another area once the height of fire season has passed at their home base.

Contract, leased, and purchased assets are acquired by the incident team as needed. These can include heavy equipment (dozers, water tenders, and so on), aviation, supplies, and contract or short-term employees.

Guiding Principles for Sharing Firefighting Assets

Firefighting assets are shared as needed – no single agency or unit has enough assets to meet peak needs. As assets are shared, four guiding principles are used:

- Total mobility – all assets can move if not needed
- Interoperability – all assets are interchangeable – training, organization, functionality, etc.
- Closest forces – use available assets that are closest, regardless of ownership
- Local control and direction of incidents – objectives, strategies, tactics are set by local unit manager (owner)

Fighting Fire

Initial Attack (95-98% of all fires): Initial attack on an incident uses local unit assets. Assets are deployed based on pre-planned dispatch ("run cards") that specify response based on conditions (time of year, location, values at risk, environmental conditions, weather, etc.) Additional "mutual aid" support from nearby units is used if needed.

Extended Attack: When an incident (fire) need additional assets the local ("zone") interagency dispatch fills "resource orders" from within the geographic extent of the dispatch area using the principles total mobility and closest forces. If sufficient assets are not available within that dispatch zone Geographic Areas will fill resource orders across dispatch boundaries. During extended attack, local forces may largely return to initial attack responsibilities.

Large Fires: For sustained large fires, a separate (temporary) fire organization established for that incident. An incident management team under the jurisdiction and authority of the local manager manages the incident. Requests for assets (resource orders) placed in the same manner described above. Local firefighting forces return to initial attack duty.

Setting Priorities

Broad national priorities are set in policy and articulated through Leaders' Intent documents from senior agency leadership. Specific priorities are set at multiple levels – to accomplish incident management objectives, to ensure efficient and cost-effective use of assets, and to adjudicate scarce assets:

- At the incident – through objectives for the incident
- Locally – among fires in a local area
- Geographically – among fires in the Geographic Areas
- Nationally – among Geographic Areas

The responsibility for setting priorities lies with agency administrators, on interagency/ intergovernmental basis as necessary. Dispatch centers and fire management staffs execute those priorities.

At the local, initial attack local multi-agency coordinating (MAC) groups of local managers set scale priorities. General priorities are set pre-season through mobilization guides and pre-planned dispatch, based on values to be protected, weather parameters, and other factors. During incidents, specific priorities are set to manage scarce assets and meet management objectives.

At the Geographic Area, level Geographic Area MAC groups of regional-level managers set priorities. Priorities are set through mobilization guides similar to local units – based on values to be protected and other parameters. During the season, priorities are established to manage scarce assets and meet management objectives. Geographic Areas set priorities among fires, not on individual fires.

At the national level, the National MAC group sets pre-season priorities through a national mobilization guide based on national policy direction. During the season, priorities are set to manage scarce assets and meet management objectives on a national scale. At the national level, priorities are set among Geographic Areas, not on individual fires. The national MAC group pays particular attention to the management of scarce and expensive "national resources/assets" (e.g. air tankers, Type 1 teams, Type 1 crews) among Geographic Areas.

Appendix E – Secretarial Order 3336

Rangeland Fire Prevention, Management, and Restoration

ORDER NO. 3336

Subject: Rangeland Fire Prevention, Management and Restoration

Sec. 1 **Purpose**. This Order sets forth enhanced policies and strategies for preventing and suppressing rangeland fire and for restoring sagebrush landscapes impacted by fire across the West. These actions are essential for conserving habitat for the greater sage-grouse as well as other wildlife species and economic activity, such as ranching and recreation, associated with the sagebrush-steppe ecosystem in the Great Basin region. This effort will build upon the experience and success of addressing rangeland fire, and broader wildland fire prevention, suppression and restoration efforts to date, including the National Cohesive Wildland Fire Management Strategy, and ensure improved coordination with local, state, tribal, and regional efforts to address the threat of rangeland fire at a landscape-level.

Sec. 2 **Background**. The Department of the Interior is entrusted with overseeing the management of Federal lands for the benefit of current and future generations as well as the protection and recovery of imperiled species of flora and fauna and the ecosystems upon which they depend. Rangeland fires in the Great Basin of the Western United States have increased in size and intensity in recent years. The accelerated invasion of non-native annual grasses, in particular cheatgrass and medusahead rye, and the spread of pinyon-juniper across the sagebrush-steppe ecosystem, along with drought and the effects of climate change, have created conditions that have led to the increased threat of rangeland fires to the sagebrush landscape and the more than 350 species of plants and animals, such as mule deer and pronghorn antelope, that rely on this critically important ecosystem. As a result, the increasing frequency and intensity of rangeland fire also poses a significant threat to ranchers, livestock managers, sportsmen, and outdoor recreation enthusiasts who use the sagebrush-steppe ecosystem, and puts at risk their associated economic contributions across this landscape that support and maintain the American way of life in the West.

In 2010, the U.S. Fish and Wildlife Service (USFWS) found that the invasion of annual grasses and the loss of habitat from fire in the Great Basin is a significant threat to the greater sage-grouse in that portion of its remaining range. The USFWS is now considering whether protections under the Endangered Species Act are warranted. In response to this finding, the Bureau of Land Management (BLM) and the U.S. Forest Service are currently undertaking land use plan revisions and amendments to incorporate appropriate conservation measures to conserve, enhance, and restore greater sage-grouse habitat by reducing, eliminating, or minimizing threats to that habitat. More targeted actions to reduce the likelihood and severity of fire, to stem the spread of invasive species, and to restore the health and resilience of the landscape are necessary to preserve, protect, and restore greater sage-grouse habitat in the sagebrush-steppe ecosystem, and address important public safety, economic, cultural, and social concerns. This includes enhanced coordination and collaboration with partners and stakeholders, including rangeland fire protection associations.

Sec. 3 **Authorities**. This Order is issued under the authority of Section 2 of Reorganization Plan No. 3 of 1950 (64 Stat.1262), as amended. Other statutory authorities related to this Order include and are not limited to the following:

a. National Environmental Policy Act (NEPA), 42 U.S.C. 4321 *et seq.*

b. The Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*

c. The Migratory Bird Conservation Act, 16 U.S.C. 715 *et seq.*

d. The National Fish and Wildlife Foundation Establishment Act, 16 U.S.C. 3701 *et seq.*

e. The Fish and Wildlife Coordination Act, 16 U.S.C. 661 *et seq.*

f. The Federal Land and Policy Management Act (FLPMA), 43 U.S.C. 1701 *et seq.*

g. The Federal Land Assistance Management and Enhancement Act of 2009, Title V of Division A of P.L. 111-88.

Sec. 4 **Policy**. Protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department. Allocation of fire management resources and assets before, during, and after wildland fire incidents will reflect this priority, as will investments related to restoration activities.

Sec. 5 **Developing an Enhanced Fire Prevention, Suppression, and Restoration Strategy**. To accomplish protection, conservation, and restoration of greater sage-grouse habitat the Department, through the Rangeland Fire Task Force established in accordance with Section 6, will:

a. Work cooperatively and collaboratively with other Federal agencies, states, tribes, local stakeholders, and non-governmental organizations on fire management and habitat restoration activities, including: (i) Enhancing the capability and capacity of state, tribal, and local government, as well as non-governmental, fire management organizations, including rangeland fire protection associations and volunteer fire departments, through improved and expanded education and training; and (ii) Improving coordination among all partners involved in rangeland fire management to further improve safety and effectiveness.

b. Utilize risk-based, landscape-scale approaches to identify and facilitate investments in fuels treatments, fire suppression capabilities, and post-fire stabilization, rehabilitation, and restoration in the Great Basin.

c. Seek to reduce the likelihood, size, and severity of rangeland fires by addressing the spread of cheatgrass and other invasive, non-native species.

d. Commit wildland fire management resources and assets to prepare for and respond to rangeland fires.

e. Advance the development and utilization of technologies for identifying areas of high ecological and habitat value in sagebrush-steppe ecosystems to enhance fire prevention and sage-grouse habitat protection efforts.

f. Apply science and research to improve the identification and protection of resistant and resilient sagebrush-steppe landscapes and the development of biocontrols and other tools for cheatgrass control to improve capability for long-term restoration of sagebrush-steppe ecosystems.

g. To the extent practicable, utilize locally-adapted seeds and native plant materials appropriate to the location, conditions, and management objectives for vegetation management and restoration activities, including strategic sourcing for acquiring, storing, and utilizing genetically-appropriate seeds and other plant materials native to the sagebrush-steppe ecosystem.

h. Encourage efforts to expedite processes, streamline procedures, and promote innovations that can improve overall rangeland fire prevention, suppression and restoration efficiency and effectiveness.

i. Explore opportunities to pilot new strategies to reduce the threat of invasive, non-native plant species and rangeland fire to sagebrush-steppe ecosystems and greater sage-grouse conservation, including enhanced use of veteran fire crews and youth conservation teams, and efforts to further public-private partnerships to expand capacity for improved fire management.

j. Establish protocols for monitoring the effectiveness of fuels management, post-fire and long-term restoration treatments and a strategy for adaptive management to modify management practices or improve land treatments when necessary.

Sec. 6 **Rangeland Fire Task Force**. A Rangeland Fire Task Force (Task Force) is hereby established and is chaired by the Deputy Secretary. Members of the Task Force shall include: Assistant Secretary – Policy, Management and Budget, Assistant Secretary – Land and Minerals Management, Assistant Secretary for Fish and Wildlife and Parks, Assistant Secretary – Water and Science, and Assistant Secretary – Indian Affairs. The Task Force will do the following:

a. Develop a science-based strategy to reduce the threat of large-scale rangeland fire to habitat for the greater sage-grouse and the sagebrush-steppe ecosystem through effective rangeland management (including the appropriate use of livestock), fire prevention, fire suppression, and post-fire restoration efforts at a landscape-scale.

b. Conduct a comprehensive review of the existing programs, policies, and practices associated with current efforts to prevent, suppress, and restore rangeland fire-impacted sagebrush-steppe, including the outcomes of the recent rangeland fire conference *The Next Steppe: Sage-grouse and Rangeland Fire in the Great Basin*, and utilize the experience of the conference participants; and the expertise of the practitioners and senior policy groups in this effort.

c. Seek input from the U.S. Geological Survey and individual Bureau Fire Directors in the Department; the U.S. Forest Service and the Natural Resources Conservation Service in the Department of Agriculture; various state wildland fire agencies and programs; the offices of the governors in the states most threatened by rangeland fire, including California, Oregon, Nevada, Utah, and Idaho, as well as the Western Governors' Association; affected American Indian tribes; scientists; and local, community-based fire organizations such as the rangeland fire protection associations, weed collaboratives, native seed production organizations, soil and water conservation districts, and various stakeholder groups with interest and expertise in rangeland fire prevention, suppression, and rangeland restoration.

Sec. 7 **Implementation Plan, Deliverables and Report**.

a. No later than February 1, 2015, the Task Force will provide a detailed plan for implementing this Order that includes a process for tribal consultation.

b. The Task Force will provide to the Secretary two reports that outline actions that can be accomplished prior to the onset of the 2015 Western fire season, actions that can be accomplished prior to the onset of the 2016 Western fire season, and actions that will require a longer period for implementation. At a minimum, these actions are to include the following:

(i) Design and implement comprehensive, integrated fire response plans for the Fire and Invasives Assessment Tool evaluation areas in the Great Basin subject to fire and invasive species;

(ii) Provide clear direction on the prioritization and allocation of fire management resources and assets; (iii) Expand the focus on fuels reduction opportunities and implementation; (iv) Fully integrate the emerging science of ecological resilience into design of habitat management, fuels management, and restoration projects; (v) Review and update emergency stabilization and burned area rehabilitation policies and programs to integrate with long-term restoration activities;

(vi) Commit to multi-year investments for the restoration of sagebrush-steppe ecosystems, including consistent long-term monitoring protocols and adaptive management for restored areas; (vii) Implement large-scale experimental activities to remove cheatgrass and other invasive annual grasses through various tools; (viii) Commit to multi-year investments in science and research; and (ix) Develop a comprehensive strategy for acquisition, storage, and distribution of seeds and other plant materials.

c. No later than March 1, 2015, the Task Force will present its initial report on actions that will be implemented prior to the 2015 Western fire season. Individual bureaus are also encouraged to take immediate action to implement improvements within their respective areas of responsibility before the initial report is issued.

d. No later than May 1, 2015, the Task Force will present its final report on activities that will be implemented prior to the 2016 Western fire season, and longer term actions to implement the policy and strategy set forth in this Order, including to ensure continued implementation of approved actions associated with the strategy.

Sec. 8 **Implementation**. The Deputy Secretary is responsible for implementing all aspects of this Order. This responsibility may be delegated as appropriate. This Order does not alter or affect any existing duty or authority of individual Assistant Secretaries or bureaus.

Sec. 9 **Effect of the Order**. This Order is intended to improve the internal management of the Department. This Order and any resulting report or recommendations are not intended to, and do not, create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its departments, agencies, instrumentalities or entities, its officers or employees, or any other person. To the extent there is any inconsistency between the provisions of this Order and any Federal laws or regulations, the laws or regulations will control.

Sec. 10 **Expiration Date**. This Order is effective immediately. It will remain in effect until its provisions are converted to the Departmental Manual, or until it is amended, superseded or revoked, whichever occurs first.

/s/ Sally Jewel

Secretary of the Interior

Date: January 5, 2015

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Appendix F – Glossary of Terms

Burned Area Rehabilitation (BAR)

The post-fire activities prescribed and implemented to rehabilitate and restore fire-damaged lands.

Draw Down Level

The minimum level of personnel and equipment resources needed (at either the local or national level) without compromising response capability.

Emergency Stabilization (ES)

Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/ replace/construct physical improvements necessary to prevent degradation of land or resources.

Initial Attack

A prepared response to wildfire given the wildfire's potential. Initial attack may include size up, patrolling, monitoring, holding action, or suppression.

Medusahead Rye

Medusahead rye is a type of annual grass.

Multi-Agency Coordinating Group (MAC Group)

A national, regional, or local management group for interagency planning, coordination, and operations leadership for incidents. Provides an essential management mechanism for strategic coordination to ensure incident resources are managed efficiently and appropriately in a cost-effective manner.

National Environmental Protection Act (NEPA)

The NEPA process ensures that information on environmental impacts is considered in the decisionmaking process undertaken by Federal agencies. The Act establishes national environmental policy, including a multidisciplinary approach to considering environmental effects in Federal Government agency decisionmaking.

Organizational Owner

Organization owner is the organization (Federal, state, or local) that funds the resource or resources.

Rangeland Fire

Any wildfire located on rangelands.

Section 106

Requires Federal agencies to consider the effects of projects they approve, fund, or carryout on historic properties.

Resilient Ecosystems

Resilient ecosystems have the capacity to regain their fundamental structure, processes, and functioning when altered by stressors like drought and disturbances, inappropriate livestock grazing, 21 and altered fire regimes.

Resistant Ecosystems

Resistant ecosystems have the capacity to retain their fundamental structure, processes, and functioning when exposed to stresses, disturbances, or invasive species.

Severity Funding

Suppression funds used to increase the level of pre-suppression capability and fire preparedness when predicted or actual burning conditions exceed those normally expected, due to severe weather conditions.

Step Up Plans

Step up plans (also called staffing plans) are designed to direct incremental preparedness actions in response to increased fire danger.

Wildfire

An unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

Fact Sheet
For Tribal Consultation
Greater Sage-grouse Plan Amendment (PA)

- **Why are the BLM/Forest Service Undertaking this Plan Amendment Effort**
  1. In 2010, the Fish and Wildlife Service (FWS) determine that the Sage –grouse was warranted for listing under the Endangered Species Act. They determined that based on higher priorities for listing, Sage-grouse would be "Precluded" from listing at that time.
  2. FWS listed "lack of regulatory mechanism" for protection of the Greater Sage-grouse as one reason for their "warranted for listing" determination.
  3. FWS was sued regarding "precluded determinations" and a Settlement Agreement reached that stated FWS will issue proposed listing decision(s) on Greater Sage-grouse by 2015.
  4. BLM and Forest Service decided they needed to amend their Land Use Plans to provide for conservation of sage grouse and will need to be completed prior to the FWS issuance of their proposed rule on Sage-grouse.
  5. BLM identified as lead federal agency and Forest Service as Cooperating Agency. One Environmental Impact Statement (EIS) will be prepared for each sub-region.
  6. BLM and the Forest Service will issue separate decisions, based upon the EIS
  7. Current Resource Management Plan (RMP) revisions by the BLM (Battle Mountain and Carson City) will incorporate the Plan Amendments into the RMP revisions.
- **Decision(s) to be Made**
  1. Identification of "priority" habitat for the sage grouse. Current definition is (defined in IM). Decision will establish:
     - Criteria
     - Current location
     - How adjusted
  2. Identification of actions that will provide for the conservation of the Greater sage-grouse.
     - By Resource program
     - By Species Management
- **Questions for Tribes**
  1. Are there areas that need protection for sage-grouse?
  2. Are there conservation actions that the BLM/FS should consider?
- **Area Included in the Analysis (Should have maps)**
  1. Greater Sage-grouse analysis divided into two Regions; Rocky Mountain Region (Eastern) and Great Basin Region (Western)
  2. Greater Basin Region further divided into sub-regions. Four (4) Sub-regions; Idaho, Oregon, western Utah, and NE California and Nevada. Our focus is on decisions for the CA/NV sub-region.
  3. Bi-State Sage-grouse population (NW Nevada/SE California) not included in this Plan Amendment effort.
- **Time Line for NEPA process**
  1. Starting Public Scoping 12/2011 and ending March 23, 2012. Scoping Report summarized public comments including list of Tribes that have stated that they wish to be have Cooperative Agency status with the BLM.
  2. Tentative list of Alternatives to be identified by mid-July
  3. Draft EIS to be issued April 2013
  4. Final EIS to be issued In February 2014
  5. Record of Decision signed by August, 2014
- **Draft Alternatives.** The following is a list of tentative range of alternatives:
  1. Current PPH and PGH with conservation actions identified in NTT report
  2. Conservation Alternatives based on information submitted by conservation groups during public scoping period
  3. BLM/FS adjustments of PPH/PGH and NTT conservation action items
  4. Governor's State Alternatives
     - Governor Sandoval establish working group that will propose 1) core sage-grouse habitat and 2) conservation action. Goal of alternative is to provide for conservation of sage-grouse and not eliminated local economic growth.

    - Tribal Representative on Group is Beverly Harry of Nixon, Nevada
  5. Additional Alternative based upon scoping, local issues.
- **Background**
  1. **National Technical Team (NTT) Report**
     - Report, developed by experts on sage-grouse, identified conservation actions for sage grouse management. Report issued in December 2012.
  2. **BLM IM for Planning and Current Projects-(Should have IM as handouts)**
     http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2012/IM_2012-043.html
     http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2012/IM_2012-044.html
     - In December 2011, the BLM WO issued two (2) Instructional Memorandums regarding their sage grouse efforts. One dealt with this Plan Amendment effort and one discusses proposed project planning and approval until such time as the Plan Amendments are approved.
     - Required the identification of Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH). BLM (and Forest Service) identified PPH and PGH based on sage-grouse classification map produced by the Nevada Department of Wildlife (NV). CA map is in the process of being developed. (Have maps as handouts)
     - Forest Service has not issued a similar document (called Interim Directive), but is currently reviewing a draft based on the BLM IM.
  3. **PPH/PGH definition in IM**
     - **PPH-** Preliminary Priority Habitat (PPH): Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas.
     - **PGH**- Areas of occupied seasonal or year-round habitat outside of priority habitat.

  4. **Governor's 2004 Conservation Strategy**
     - In 2004, Nevada issued a Conservation Strategy (primarily focused on habitat restoration actions and species inventories) that was based on information developed by local working groups for each identified sage-grouse Population Management Units (PMU). The agencies will use that plan to assist identification of conservation actions.
  5. **Biological (species information)**
     - Discuss with local biologist for specific information in your area.

- **Contacts (for internal use only)**
  1. **BLM-**
     - Plan Amendment Issues: Raul Morales, Joe Tague, Brian Amme
     - Tribal Consultation Issues: Bryan Hockett, Brian Amme
  2. **Forest Service**
     - Plan Amendment Issues; Stephanie Phillips, Randy Sharp
     - Tribal Consultation Issues: Fred Frampton

Alex Finch

From: Mermejo, Lauren <lmermejo@blm.gov>
Sent: Wednesday, August 12, 2015 1:22 PM
To: nvca sagegrouse
Subject: Fwd: FW: QA QC Checklist and Signature Form
Attachments: QA QC checklist and finalization form_2_3_15.docx

---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Tue, Feb 3, 2015 at 5:12 PM
Subject: FW: QA QC Checklist and Signature Form
To: Quincy Bahr <qfbahr@blm.gov>, Joan Suther <jsuther@blm.gov>, jmbeck@blm.gov, "Lauren L. Mermejo" <lmermejo@blm.gov>, Randall Sharp <sharphay@att.net>, Jessica Rubado <jarubado@blm.gov>
Cc: lwesch@blm.gov, Matthew Magaletti <mmagalet@blm.gov>, Michael Hildner <mhildner@blm.gov>

Hi All –

This is a great tool for all of us to use for the QA/QC data CEQ call to the NOC. Matt put this together and is going to have the Rocky Mountain side use this. I would ask that we all use it and that you would forward the signed copy of this to me (via e-mail) prior to my review beginning on February 11.

Please share with your GIS specialists.

Thank-you!

Lauren

--
Lauren L. Mermejo
Great Basin Greater Sage-Grouse Project Mgr.
BLM, Nevada State Office
775 861-6580

Administrative Draft Proposed Plan Allocation Data Submission Worksheet

Please scan and email this form to your designated regional project coordinator once completed.

QA/QC Step	Completed (initial by ASD or DSD)
Data Development	
Data has been clipped to the EIS area boundaries submitted by the planning leads.	
Data has been clipped to where the BLM/FS has management authority.	
Data has NOT been clipped to habitat (priority, general). *Decision data must cover your entire planning areas. The NOC will clip data to display it only within habitat management types.*	
Data should not overlap between decision categories within a program area (e.g. the four fluid mineral (oil and gas) decision categories do not overlap).	
Data errors that were discovered in the past few months have been corrected.	
Data related to wilderness areas, ACECs, and coal have not been submitted.	
Data associated with buffer distances are only displayed if they are tied to a land use planning allocation decisions (specifically for fluid mineral allocations/stipulations)	
Data associated with subsurface areas are included in the fluid mineral, locatable mineral and other mineral categories, if available.	
Data Map Verifications	
Folder structure, naming conventions, and categories that the Data Management Team agreed to have been used and there are no variations of names and additional categories.	
Data layers already submitted to the NOC that have NOT changed have been noted in the tracking spreadsheet.	
The following Proposed Plan PDF maps have been emailed to our Regional Project Coordinator (Lauren Mermejo, Great Basin and Matthew Magaletti, Rocky Mtn) before COB February 10, 2015: habitat delineations, land tenure, ROWs (major only), utility corridors, wind, solar, fluid, geothermal, locatable, salable, non-energy, and trails and travel management.	

I affirm that the follow steps identified above have been completed for our sub-region.

Associate State Director or Deputy State Director

Date

PL_PUB_5055
8.2

From:	Quamen, Frank
Sent:	Friday, August 1, 2014 1:35 PM
To:	Kathryn Stangl; Raby, Jon K; Edwin Roberson; Lauren Mermejo; Matthew Magaletti; Joseph Stout
Subject:	Fwd: Maps & Tables
Attachments:	HabitatByPAC_and_PopulationSummary_Final_Tables.xlsx

All,
The GB maps are done. Please use the link below to access the PDFs. Also attached is the revised tables based on Lauren's input.

Have a good weekend,
Frank

---------- Forwarded message ----------
From: **Anthony Titolo** <atitolo@blm.gov>
Date: Friday, August 1, 2014
Subject: Maps & Tables
To: "Quamen, Frank R" <fquamen@blm.gov>
Cc: kmayne@blm.gov, sglazer@blm.gov, shaymes@blm.gov

Hi Frank,

We have completed and consolidated the maps for the G.B. Rollup meeting. They can be accessed in the following folder: T:\OC\Wildlife\Transfers\Frank\Proposed_Data\GreatBasin.

The permissions are set to allow authenticated active directory users access, so clicking or pasting the folder link above into Windows Explorer should get everyone into the location. Each individual map as well as a consolidated pdf are in there. I printed out the consolidated version and it came out clear and crisp. If you would like Shannon to add your table of contents to this compiled PDF just provide her the file and she will get it updated.

The updated population summary table is attached and linked below for reference.

T:\ProjectsNational\GRSG\CEA\GRSG_Analysis\GRSG\GRSG_Tier_II\Proposed_Data\ManagementZoneProcessing\Final_Excel_Outputs\Proposed_RollUp_Meeting\HabitatByPAC_and_PopulationSummary_Final_Tables.xlsx

Anthony

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NOC/BLM/DOI

303-236-0446

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Subregion	PAC Acreage by Subregion	BLM and FS Priority Habitat (acres)*		BLM General H
		Within PAC	Outside PAC	Within PAC
Oregon	6,557,426	6,556,460	1	629
Idaho/SW Montana	11,218,569	10,589,448	1,385,554	227,912
Nevada/California	21,230,447	14,471,307	1,691,901	2,596,812
Utah	7,454,538	5,341,639	211,351	31,718
Montana	7,665,061	7,433,759	893,531	68,507
North Dakota	461,082	461,082	1	0
South Dakota	621,613	621,603	361,746	10
Wyoming	14,707,729	14,706,841	375,605	466
Colorado	2,365,295	2,363,868	83	1

** Includes Core and Important Habitat for Idaho*

l and FS labitat (acres)	BLM and FS Non-Habitat (acres)		Populations within Subregion (numbers)
Outside PAC	Within PAC	Outside PAC	
8,219,803	336	16,896,923	17, 26a, 28, 29, 31
5,462,819	401,209	34,628,134	18, 19-22, 23, 25, 26a, 27
3,244,077	4,162,329	44,075,489	14, 15c, 16, 26a, 29, 30, 31
1,765,204	2,081,181	38,805,159	9b, 9c, 10a, 10b, 11, 12-13a, 13b, 13c, 15a, 15b, 26b
17,397,270	162,795	34,355,661	2, 3, 4, 9a, 24
242,302	0	259,636	1
1,173,899	0	47,339,363	1
26,359,945	422	12,453,498	3, 7, 8, 9a,
1,781,687	1,426	11,050,816	5, 6, 9d, 9e, 34, 35

NW Interior NV, Sourthern Great Basin, and

	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres	% of Population	SMA	Acres
PAC	BLM:	4,075,403	16.51%	BLM:	1,193,253
	FS:	548,796	2.22%	FS:	125,898
	BIA:	11,448	0.05%	BIA:	9,119
	Other Federal:	0	0.00%	Other Federal:	0
	Private:	375,412	1.52%	Private:	190,959
	State:	51	0.00%	State:	0
	Other:	300	0.00%	Other:	0
Non-PAC	BLM:	808,526	3.28%	BLM:	1,718,784
	FS:	103,312	0.42%	FS:	168,247
	BIA:	34,961	0.14%	BIA:	3,350
	Other Federal:	11,532	0.05%	Other Federal:	5,880
	Private:	153,184	0.62%	Private:	187,889
	State:	5,347	0.02%	State:	221
	Other:	3,461	0.01%	Other:	812
Totals		6,131,732	24.85%		3,604,413

Rich-Morgan-Summit, Uintah, Strawberry Valley, Carbon, Sheeprock Mountains, Parker Mou
10b, 11, 12, 13

	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres	% of Population	SMA	Acres
PAC	BLM:	1,992,834	26.60%	BLM:	13,350
	FS:	745,919	9.96%	FS:	3,184
	BIA:	27,990	0.37%	BIA:	0
	Other Federal:	13,394	0.18%	Other Federal:	0
	Private:	2,062,374	27.53%	Private:	13,120
	State:	556,422	7.43%	State:	2,064
	Other:	0	0.00%	Other:	0
Non-PAC	BLM:	4	0.00%	BLM:	0
	FS:	0	0.00%	FS:	0
	BIA:	19	0.00%	BIA:	0
	Other Federal:	0	0.00%	Other Federal:	0
	Private:	1	0.00%	Private:	0
	State:	0	0.00%	State:	0
	Other:	0	0.00%	Other:	0
Totals		5,398,957	72.08%		31,718

SW Montana P

	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres	% of Population	SMA	Acres
PAC	BLM:	458,924	15.48%	BLM:	0
	FS:	147,667	4.98%	FS:	0
	BIA:	0	0.00%	BIA:	0
	Other Federal:	41,410	1.40%	Other Federal:	0

	Private:	450,756	15.21%	Private:	0
	State:	222,405	7.50%	State:	0
	Other:	8,088	0.27%	Other:	0
Non-PAC	BLM:	2,392	0.08%	BLM:	162,044
	FS:	11,705	0.39%	FS:	139,030
	BIA:	0	0.00%	BIA:	0
	Other Federal:	0	0.00%	Other Federal:	1,102
	Private:	625	0.02%	Private:	291,792
	State:	393	0.01%	State:	103,007
	Other:	0	0.00%	Other:	150
Totals		1,344,365	45.36%		697,125

Northern Great Ba

	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres	% of Population	SMA	Acres
PAC	BLM:	8,569,130	33.34%	BLM:	507,323
	FS:	749,772	2.92%	FS:	160,945
	BIA:	161,978	0.63%	BIA:	1,725
	Other Federal:	93,543	0.36%	Other Federal:	0
	Private:	2,575,368	10.02%	Private:	131,945
	State:	326,791	1.27%	State:	4,162
	Other:	42	0.00%	Other:	0
Non-PAC	BLM:	490,035	1.91%	BLM:	2,836,106
	FS:	61,915	0.24%	FS:	192,973
	BIA:	2,514	0.01%	BIA:	488
	Other Federal:	31,896	0.12%	Other Federal:	40,642
	Private:	264,938	1.03%	Private:	1,261,637
	State:	34,909	0.14%	State:	339,174
	Other:	0	0.00%	Other:	537
Totals		13,362,831	51.99%		5,477,657

E. Central ID, Snake Salmon and Beaverhead,

	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres	% of Population	SMA	Acres
PAC	BLM:	2,941,568	21.51%	BLM:	86,279
	FS:	313,417	2.29%	FS:	5,100
	BIA:	0	0.00%	BIA:	0
	Other Federal:	402,626	2.94%	Other Federal:	5,104
	Private:	817,310	5.98%	Private:	27,191
	State:	302,901	2.22%	State:	4,113
	Other:	240	0.00%	Other:	1,114
Non-PAC	BLM:	467,106	3.42%	BLM:	855,232
	FS:	81,821	0.60%	FS:	100,714
	BIA:	0	0.00%	BIA:	37,083
	Other Federal:	39,377	0.29%	Other Federal:	126,059
	Private:	97,976	0.72%	Private:	673,236

	State:	28,984	0.21%	State:	195,543
	Other:	28	0.00%	Other:	1,196
Totals		5,493,353	40.18%		2,117,964

Baker and Central O					
	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres	% of Population	SMA	Acres
PAC	BLM:	472,596	10.67%	BLM:	0
	FS:	19,312	0.44%	FS:	0
	BIA:	0	0.00%	BIA:	0
	Other Federal:	19	0.00%	Other Federal:	0
	Private:	491,640	11.10%	Private:	0
	State:	28,279	0.64%	State:	0
	Other:	578	0.01%	Other:	0
Non-PAC	BLM:	0	0.00%	BLM:	1,256,921
	FS:	0	0.00%	FS:	58,425
	BIA:	0	0.00%	BIA:	173
	Other Federal:	0	0.00%	Other Federal:	14,622
	Private:	0	0.00%	Private:	525,683
	State:	0	0.00%	State:	28,259
	Other:	0	0.00%	Other:	3,597
Totals		1,012,424	22.86%		1,887,679

Western Great Ba					
	PH/PPMA/Core (Important)			GH/PGMA	
	SMA	Acres		SMA	Acres
PAC	BLM:	4,809,659	33.80%	BLM:	222,377
	FS:	22,662	0.16%	FS:	1
	BIA:	9,600	0.07%	BIA:	345
	Other Federal:	703,402	4.94%	Other Federal:	23,825
	Private:	315,140	2.21%	Private:	12,126
	State:	36,176	0.25%	State:	0
	Other:	415,230	2.92%	Other:	15,811
Non-PAC	BLM:	60,052	0.42%	BLM:	2,294,184
	FS:	0	0.00%	FS:	31,840
	BIA:	0	0.00%	BIA:	0
	Other Federal:	2,428	0.02%	Other Federal:	43,713
	Private:	2,232	0.02%	Private:	484,741
	State:	5	0.00%	State:	43,492
	Other:	179	0.00%	Other:	75,885
Totals		6,376,765	44.81%		3,248,341

Quinn Canyon Range Population Statistics (14, 15c & 30)

	Non-Habitat			Totals	
% of Population	SMA	Acres	% of Population	Acres	% of Population
4.83%	BLM:	1,995,940	8.09%	7,264,596	29.44%
0.51%	FS:	866,949	3.51%	1,541,642	6.25%
0.04%	BIA:	14,451	0.06%	35,019	0.14%
0.00%	Other Federal:	6	0.00%	6	0.00%
0.77%	Private:	207,587	0.84%	773,959	3.14%
0.00%	State:	158	0.00%	209	0.00%
0.00%	Other:	648	0.00%	948	0.00%
6.96%	BLM:	8,575,055	34.75%	11,102,365	44.99%
0.68%	FS:	1,373,050	5.56%	1,644,609	6.66%
0.01%	BIA:	43,023	0.17%	81,334	0.33%
0.02%	Other Federal:	183,561	0.74%	200,972	0.81%
0.76%	Private:	1,653,278	6.70%	1,994,351	8.08%
0.00%	State:	17,008	0.07%	22,576	0.09%
0.00%	Other:	12,968	0.05%	17,241	0.07%
14.60%		14,943,682	60.55%	24,679,827	100%

ntain-Emery, Panguitch, Bald Hills, Ibapah, Hamlin Valley, and Box Elder Population Statistics (9b, 9c, 10a, a, 13b, 13c, 15a, 15b, 26b)

	Non-Habitat			Totals	
% of Population	SMA	Acres	% of Population	Acres	% of Population
0.18%	BLM:	816,406	10.90%	2,822,590	37.68%
0.04%	FS:	526,041	7.02%	1,275,144	17.02%
0.00%	BIA:	3,853	0.05%	31,843	0.43%
0.00%	Other Federal:	44,048	0.59%	57,442	0.77%
0.18%	Private:	508,498	6.79%	2,583,992	34.50%
0.03%	State:	157,482	2.10%	715,968	9.56%
0.00%	Other:	0	0.00%	0	0.00%
0.00%	BLM:	2,725	0.04%	2,729	0.04%
0.00%	FS:	0	0.00%	0	0.00%
0.00%	BIA:	138	0.00%	157	0.00%
0.00%	Other Federal:	0	0.00%	0	0.00%
0.00%	Private:	274	0.00%	275	0.00%
0.00%	State:	404	0.01%	404	0.01%
0.00%	Other:	0	0.00%	0	0.00%
0.42%		2,059,869	27.50%	7,490,544	100%

opulation Statistics (19-22)

	Non-Habitat			Totals	
% of Population	SMA	Acres	% of Population	Acres	% of Population
0.00%	BLM:	0	0.00%	458,924	15.48%
0.00%	FS:	163	0.01%	147,830	4.99%
0.00%	BIA:	0	0.00%	0	0.00%
0.00%	Other Federal:	0	0.00%	41,410	1.40%

0.00%	Private:	321	0.01%	451,077	15.22%
0.00%	State:	0	0.00%	222,405	7.50%
0.00%	Other:	0	0.00%	8,088	0.27%
5.47%	BLM:	117,513	3.96%	281,950	9.51%
4.69%	FS:	395,626	13.35%	546,360	18.43%
0.00%	BIA:	0	0.00%	0	0.00%
0.04%	Other Federal:	15,786	0.53%	16,888	0.57%
9.85%	Private:	322,445	10.88%	614,862	20.75%
3.48%	State:	69,483	2.34%	172,883	5.83%
0.01%	Other:	934	0.03%	1,084	0.04%
23.52%		922,270	31.12%	2,963,761	100%

sin Population Statistics (26a)

	Non-Habitat			Totals	
% of Population	SMA	Acres	% of Population	Acres	% of Population
1.97%	BLM:	192,183	0.75%	9,268,636	36.06%
0.63%	FS:	132,133	0.51%	1,042,850	4.06%
0.01%	BIA:	143,974	0.56%	307,677	1.20%
0.00%	Other Federal:	7	0.00%	93,550	0.36%
0.51%	Private:	117,253	0.46%	2,824,566	10.99%
0.02%	State:	56	0.00%	331,009	1.29%
0.00%	Other:	0	0.00%	42	0.00%
11.03%	BLM:	2,285,875	8.89%	5,612,016	21.83%
0.75%	FS:	752,957	2.93%	1,007,845	3.92%
0.00%	BIA:	5,174	0.02%	8,176	0.03%
0.16%	Other Federal:	193,672	0.75%	266,210	1.04%
4.91%	Private:	2,889,132	11.24%	4,415,707	17.18%
1.32%	State:	136,606	0.53%	510,689	1.99%
0.00%	Other:	13,476	0.05%	14,013	0.05%
21.31%		6,862,498	26.70%	25,702,986	100%

eiser, and Sawtooth Population Statistics (18, 23, 25, 27)

	Non-Habitat			Totals	
% of Population	SMA	Acres	% of Population	Acres	% of Population
0.63%	BLM:	64,802	0.47%	3,092,648	22.62%
0.04%	FS:	102,362	0.75%	420,879	3.08%
0.00%	BIA:	0	0.00%	0	0.00%
0.04%	Other Federal:	98,493	0.72%	506,222	3.70%
0.20%	Private:	62,875	0.46%	907,375	6.64%
0.03%	State:	26,288	0.19%	333,303	2.44%
0.01%	Other:	383	0.00%	1,738	0.01%
6.26%	BLM:	550,225	4.02%	1,872,563	13.70%
0.74%	FS:	2,100,542	15.36%	2,283,077	16.70%
0.27%	BIA:	29,523	0.22%	66,607	0.49%
0.92%	Other Federal:	397,648	2.91%	563,084	4.12%
4.92%	Private:	2,392,700	17.50%	3,163,912	23.14%

1.43%	State:	216,321	1.58%	440,848	3.22%
0.01%	Other:	19,079	0.14%	20,303	0.15%
15.49%		6,061,242	44.33%	13,672,559	100%

R Population Statistics (17 & 28)

	Non-Habitat			Totals	
% of Population	SMA	Acres	% of Population	Acres	% of Population
0.00%	BLM:	0	0.00%	472,596	10.67%
0.00%	FS:	116	0.00%	19,428	0.44%
0.00%	BIA:	0	0.00%	0	0.00%
0.00%	Other Federal:	0	0.00%	19	0.00%
0.00%	Private:	8,464	0.19%	500,104	11.29%
0.00%	State:	0	0.00%	28,279	0.64%
0.00%	Other:	0	0.00%	578	0.01%
28.38%	BLM:	438,555	9.90%	1,695,476	38.29%
1.32%	FS:	597,892	13.50%	656,317	14.82%
0.00%	BIA:	280	0.01%	453	0.01%
0.33%	Other Federal:	2,172	0.05%	16,794	0.38%
11.87%	Private:	455,066	10.28%	980,749	22.15%
0.64%	State:	16,427	0.37%	44,686	1.01%
0.08%	Other:	9,366	0.21%	12,963	0.29%
42.63%		1,528,338	34.51%	4,428,442	100.00%

asin Population Statistics (31)

	Non-Habitat			Totals	
	SMA	Acres		Acres	% of Population
1.56%	BLM:	200,199	1.41%	5,232,234	36.76%
0.00%	FS:	0	0.00%	22,663	0.16%
0.00%	BIA:	568	0.00%	10,514	0.07%
0.17%	Other Federal:	11,264	0.08%	738,491	5.19%
0.09%	Private:	9,435	0.07%	336,701	2.37%
0.00%	State:	0	0.00%	36,176	0.25%
0.11%	Other:	63,776	0.45%	494,816	3.48%
16.12%	BLM:	2,299,840	16.16%	4,654,076	32.70%
0.22%	FS:	622,779	4.38%	654,619	4.60%
0.00%	BIA:	21,982	0.15%	21,982	0.15%
0.31%	Other Federal:	233,636	1.64%	279,777	1.97%
3.41%	Private:	452,878	3.18%	939,851	6.60%
0.31%	State:	49,429	0.35%	92,926	0.65%
0.53%	Other:	640,922	4.50%	716,986	5.04%
22.82%		4,606,708	32.37%	14,231,813	100.00%

Northern Montana Population Statistics (2) -

	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	1,263,381	14.24%	BLM:	88	0.00%
	FS:	0	0.00%	FS:	0	0.00%
	BIA:	533	0.01%	BIA:	72	0.00%
	Other Federal:	5,566	0.06%	Other Federal:	56,703	0.64%
	Private:	614,510	6.92%	Private:	10	0.00%
	State:	180,217	2.03%	State:	15	0.00%
	Other:	129	0.00%	Other:	0	0.00%
Non-PAC	BLM:	178,135	2.01%	BLM:	350,513	3.95%
	FS:	0	0.00%	FS:	0	0.00%
	BIA:	122	0.00%	BIA:	169,113	1.91%
	Other Federal:	1,611	0.02%	Other Federal:	23,942	0.27%
	Private:	104,132	1.17%	Private:	488,633	5.51%
	State:	20,373	0.23%	State:	56,921	0.64%
	Other:	0	0.00%	Other:	1,372	0.02%
Totals		2,368,709	26.69%		1,147,382	12.93%

Laramie & Jackson Hole Population Statis

	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	0	0.00%	BLM:	0	0.00%
	FS:	2,870	0.24%	FS:	0	0.00%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	269	0.02%	Other Federal:	0	0.00%
	Private:	4	0.00%	Private:	0	0.00%
	State:	0	0.00%	State:	0	0.00%
	Other:	0	0.00%	Other:	0	0.00%
Non-PAC	BLM:	0	0.00%	BLM:	16,425	1.38%
	FS:	0	0.00%	FS:	176,250	14.81%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	0	0.00%	Other Federal:	208	0.02%
	Private:	0	0.00%	Private:	24,163	2.03%
	State:	0	0.00%	State:	4,950	0.42%
	Other:	0	0.00%	Other:	520	0.04%
Totals		3,143	0.26%		222,516	18.70%

Eagle/S. Routt, Middle Park, North Park, NW Colorado, Parachute - Piceance - Roan, and Me

	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	912,035	13.59%	BLM:	34	0.00%
	FS:	1,761	0.03%	FS:	0	0.00%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	31,653	0.47%	Other Federal:	4	0.00%
	Private:	1,127,138	16.80%	Private:	18	0.00%

	State:	172,369	2.57%	State:	2	0.00%
	Other:	29,359	0.44%	Other:	36	0.00%
Non-PAC	BLM:	34	0.00%	BLM:	662,437	9.87%
	FS:	0	0.00%	FS:	11,207	0.17%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	9	0.00%	Other Federal:	27,003	0.40%
	Private:	47	0.00%	Private:	673,062	10.03%
	State:	4	0.00%	State:	70,809	1.06%
	Other:	8	0.00%	Other:	7,066	0.11%
Totals		2,274,417	33.90%		1,451,678	21.64%

Dakotas Population Statistics (1

	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	149,413	5.37%	BLM:	1	0.00%
	FS:	59,342	2.13%	FS:	0	0.00%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	0	0.00%	Other Federal:	0	0.00%
	Private:	767,825	27.60%	Private:	7	0.00%
	State:	116,019	4.17%	State:	3	0.00%
	Other:	5,369	0.19%	Other:	0	0.00%
Non-PAC	BLM:	31,467	1.13%	BLM:	26,751	0.96%
	FS:	1	0.00%	FS:	32,111	1.15%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	200	0.01%	Other Federal:	5,558	0.20%
	Private:	261,096	9.39%	Private:	895,676	32.20%
	State:	29,900	1.07%	State:	138,473	4.98%
	Other:	852	0.03%	Other:	2,179	0.08%
Totals		1,421,484	51.10%		1,100,759	39.57%

Powder River Population Statistic

	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	556,950	3.17%	BLM:	1	0.00%
	FS:	217,333	1.24%	FS:	0	0.00%
	BIA:	147	0.00%	BIA:	0	0.00%
	Other Federal:	80	0.00%	Other Federal:	0	0.00%
	Private:	1,754,988	9.98%	Private:	140	0.00%
	State:	273,338	1.56%	State:	3	0.00%
	Other:	0	0.00%	Other:	0	0.00%
Non-PAC	BLM:	27,354	0.16%	BLM:	1,098,634	6.25%
	FS:	6,386	0.04%	FS:	359,638	2.05%
	BIA:	0	0.00%	BIA:	81,455	0.46%
	Other Federal:	0	0.00%	Other Federal:	26,240	0.15%
	Private:	249,624	1.42%	Private:	8,120,678	46.20%
	State:	16,096	0.09%	State:	867,624	4.94%

	Other:	0	0.00%	Other:	13,471	0.08%
Totals		3,102,296	17.65%		10,567,884	60.12%

Wyoming Basin Population Statisti						
	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	7,372,271	21.01%	BLM:	145	0.00%
	FS:	35,017	0.10%	FS:	0	0.00%
	BIA:	293,888	0.84%	BIA:	0	0.00%
	Other Federal:	179,584	0.51%	Other Federal:	0	0.00%
	Private:	4,119,308	11.74%	Private:	40	0.00%
	State:	851,565	2.43%	State:	52	0.00%
	Other:	44,548	0.13%	Other:	1	0.00%
Non-PAC	BLM:	8,203	0.02%	BLM:	8,265,163	23.55%
	FS:	878,083	2.50%	FS:	126,758	0.36%
	BIA:	1,163,601	3.32%	BIA:	26,386	0.08%
	Other Federal:	116,048	0.33%	Other Federal:	280,026	0.80%
	Private:	405,423	1.16%	Private:	6,166,903	17.57%
	State:	4,263	0.01%	State:	909,945	2.59%
	Other:	30,633	0.09%	Other:	62,123	0.18%
Totals		15,502,435	44.17%		15,837,542	45.13%

Belt Mountains Population Statistic						
	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
PAC	BLM:	0	0.00%	BLM:	0	0.00%
	FS:	0	0.00%	FS:	0	0.00%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	0	0.00%	Other Federal:	0	0.00%
	Private:	0	0.00%	Private:	0	0.00%
	State:	0	0.00%	State:	0	0.00%
	Other:	0	0.00%	Other:	0	0.00%
Non-PAC	BLM:	0	0.00%	BLM:	430	0.04%
	FS:	0	0.00%	FS:	1,626	0.15%
	BIA:	0	0.00%	BIA:	0	0.00%
	Other Federal:	0	0.00%	Other Federal:	0	0.00%
	Private:	0	0.00%	Private:	300,890	28.50%
	State:	0	0.00%	State:	28,430	2.69%
	Other:	0	0.00%	Other:	0	0.00%
Totals		0	0.00%		331,376	31.39%

Yellowstone Watershed Population Sta						
	PH/PPMA/Core (Important)			GH/PGMA		
	SMA	Acres	% of Population	SMA	Acres	% of Population
	BLM:	907,715	3.59%	BLM:	1,326	0.01%
	FS:	362	0.00%	FS:	0	0.00%

PAC	BIA:	521	0.00%	BIA:	0	0.00%
	Other Federal:	4,452	0.02%	Other Federal:	0	0.00%
	Private:	3,499,647	13.86%	Private:	3,561	0.01%
	State:	375,820	1.49%	State:	385	0.00%
	Other:	2,645	0.01%	Other:	0	0.00%
Non-PAC	BLM:	242,512	0.96%	BLM:	1,486,840	5.89%
	FS:	0	0.00%	FS:	25,235	0.10%
	BIA:	151	0.00%	BIA:	115,321	0.46%
	Other Federal:	82,337	0.33%	Other Federal:	107,830	0.43%
	Private:	279,363	1.11%	Private:	9,535,093	37.76%
	State:	32,579	0.13%	State:	720,274	2.85%
	Other:	0	0.00%	Other:	30,294	0.12%
Totals		5,428,104	21.50%		12,026,159	47.62%

U.S. area only

	Non-Habitat		Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	634	0.01%	1,264,103	14.24%
FS:	0	0.00%	0	0.00%
BIA:	121,201	1.37%	121,806	1.37%
Other Federal:	28,374	0.32%	90,643	1.02%
Private:	57	0.00%	614,577	6.92%
State:	6,420	0.07%	186,652	2.10%
Other:	43	0.00%	172	0.00%
BLM:	737,646	8.31%	1,266,294	14.27%
FS:	0	0.00%	0	0.00%
BIA:	506,361	5.71%	675,596	7.61%
Other Federal:	286,127	3.22%	311,680	3.51%
Private:	3,304,748	37.24%	3,897,513	43.92%
State:	355,023	4.00%	432,317	4.87%
Other:	12,082	0.14%	13,454	0.15%
	5,358,716	60.38%	8,874,807	100%

tics (7 & 8)

	Non-Habitat		Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	2	0.00%	2	0.00%
FS:	0	0.00%	2,870	0.24%
BIA:	0	0.00%	0	0.00%
Other Federal:	77,170	6.48%	77,439	6.51%
Private:	4,253	0.36%	4,257	0.36%
State:	0	0.00%	0	0.00%
Other:	1	0.00%	1	0.00%
BLM:	17,687	1.49%	34,112	2.87%
FS:	598,430	50.29%	774,680	65.10%
BIA:	0	0.00%	0	0.00%
Other Federal:	130,831	10.99%	131,039	11.01%
Private:	117,106	9.84%	141,269	11.87%
State:	16,339	1.37%	21,289	1.79%
Other:	2,532	0.21%	3,052	0.26%
	964,351	81.04%	1,190,010	100%

eker - White River Population Statistics (5, 6, 9d, 9e, 34 & 35)

	Non-Habitat		Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	615	0.01%	912,684	13.60%
FS:	0	0.00%	1,761	0.03%
BIA:	0	0.00%	0	0.00%
Other Federal:	160	0.00%	31,817	0.47%
Private:	768	0.01%	1,127,924	16.81%

State:	162	0.00%	172,533	2.57%
Other:	648	0.01%	30,043	0.45%
BLM:	1,044,695	15.57%	1,707,166	25.44%
FS:	605,783	9.03%	616,990	9.20%
BIA:	0	0.00%	0	0.00%
Other Federal:	145,842	2.17%	172,854	2.58%
Private:	1,088,876	16.23%	1,761,985	26.26%
State:	59,391	0.89%	130,204	1.94%
Other:	36,385	0.54%	43,459	0.65%
	2,983,325	44.46%	6,709,420	100%

l)

	Non-Habitat		Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	10	0.00%	149,424	5.37%
FS:	0	0.00%	59,342	2.13%
BIA:	0	0.00%	0	0.00%
Other Federal:	0	0.00%	0	0.00%
Private:	29	0.00%	767,861	27.60%
State:	0	0.00%	116,022	4.17%
Other:	0	0.00%	5,369	0.19%
BLM:	13,131	0.47%	71,349	2.56%
FS:	30,894	1.11%	63,006	2.26%
BIA:	0	0.00%	0	0.00%
Other Federal:	0	0.00%	5,758	0.21%
Private:	206,148	7.41%	1,362,920	48.99%
State:	9,332	0.34%	177,705	6.39%
Other:	0	0.00%	3,031	0.11%
	259,544	9.33%	2,781,787	100%

s (3)

	Non-Habitat		Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	452	0.00%	557,403	3.17%
FS:	0	0.00%	217,333	1.24%
BIA:	0	0.00%	147	0.00%
Other Federal:	0	0.00%	80	0.00%
Private:	3,445	0.02%	1,758,573	10.01%
State:	532	0.00%	273,873	1.56%
Other:	1	0.00%	1	0.00%
BLM:	102,199	0.58%	1,228,187	6.99%
FS:	918,113	5.22%	1,284,137	7.31%
BIA:	618,481	3.52%	699,936	3.98%
Other Federal:	51,761	0.29%	78,001	0.44%
Private:	1,992,417	11.34%	10,362,719	58.96%
State:	198,086	1.13%	1,081,806	6.15%

Other:	20,890	0.12%	34,361	0.20%
	3,906,377	22.22%	17,576,557	100%

cs (9a)

Non-Habitat			Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	392	0.00%	7,372,808	21.01%
FS:	399	0.00%	35,416	0.10%
BIA:	0	0.00%	293,888	0.84%
Other Federal:	0	0.00%	179,584	0.51%
Private:	11,016	0.03%	4,130,364	11.77%
State:	615	0.00%	852,232	2.43%
Other:	11,119	0.03%	55,668	0.16%
BLM:	233,703	0.67%	8,507,069	24.24%
FS:	1,849,364	5.27%	2,854,205	8.13%
BIA:	170,693	0.49%	1,360,680	3.88%
Other Federal:	66,012	0.19%	462,086	1.32%
Private:	1,210,312	3.45%	7,782,638	22.18%
State:	140,961	0.40%	1,055,169	3.01%
Other:	59,499	0.17%	152,255	0.43%
	3,754,085	10.70%	35,094,062	100%

s (24)

Non-Habitat			Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	0	0.00%	0	0.00%
FS:	0	0.00%	0	0.00%
BIA:	0	0.00%	0	0.00%
Other Federal:	0	0.00%	0	0.00%
Private:	0	0.00%	0	0.00%
State:	0	0.00%	0	0.00%
Other:	0	0.00%	0	0.00%
BLM:	6,268	0.59%	6,698	0.63%
FS:	228,623	21.66%	230,249	21.81%
BIA:	0	0.00%	0	0.00%
Other Federal:	0	0.00%	0	0.00%
Private:	453,430	42.95%	754,320	71.45%
State:	36,038	3.41%	64,468	6.11%
Other:	15	0.00%	15	0.00%
	724,374	68.61%	1,055,750	100%

tistics (4)

Non-Habitat			Totals	
SMA	Acres	% of Population	Acres	% of Population
BLM:	0	0.00%	909,041	3.60%
FS:	0	0.00%	362	0.00%

BIA:	0	0.00%	521	0.00%
Other Federal:	0	0.00%	4,452	0.02%
Private:	0	0.00%	3,503,208	13.87%
State:	0	0.00%	376,205	1.49%
Other:	0	0.00%	2,645	0.01%
BLM:	491,000	1.94%	2,220,352	8.79%
FS:	292,216	1.16%	317,451	1.26%
BIA:	314,129	1.24%	429,601	1.70%
Other Federal:	298,292	1.18%	488,459	1.93%
Private:	5,968,271	23.63%	15,782,727	62.50%
State:	377,862	1.50%	1,130,715	4.48%
Other:	56,620	0.22%	86,914	0.34%
	7,798,390	30.88%	25,252,653	100%

From: Froistad, Alisa
Sent: Thursday, December 18, 2014 8:39 AM
To: Anthony Titolo
Subject: Fwd: National Plant GRSG data call- initial review

---------- Forwarded message ----------
From: **Kwong, Olivia** <okwong@blm.gov>
Date: Thu, Dec 18, 2014 at 8:51 AM
Subject: Re: National Plant GRSG data call- initial review
To: "Herren, Vicki" <vherren@blm.gov>
Cc: "Froistad, Alisa" <afroistad@blm.gov>, "Margaret (Peggy) Olwell" <polwell@blm.gov>

So, we're looking for something that covers an area like this image: http://www.fs.fed.us/rm/boise/research/gis/maps/GreatBasinMap.jpg

I can't read these files, but does the first entry "Great Basin Outline" on this page cover something like the area in the image link above? http://keck.library.unr.edu/datasets/gbgd.aspx

Olivia Kwong
CPC/PCA
http://www.blm.gov/pca
okwong@blm.gov
202-912-7232

On Thu, Dec 18, 2014 at 10:45 AM, Herren, Vicki <vherren@blm.gov> wrote:

> Actually it will need to include most of Nevada. Olivia is looking for an example and may be able to send a link
>
> On Thu, Dec 18, 2014 at 10:39 AM, Froistad, Alisa <afroistad@blm.gov> wrote:
>
> > Just to confirm, the "Great Basin" boundary you are referring to is the Northern Great Basin Ecoregion boundary?
> >
> > On Thu, Dec 18, 2014 at 8:28 AM, Kwong, Olivia <okwong@blm.gov> wrote:
> >
> > > That sounds fine to me!
> > >
> > > **Olivia Kwong**
> > > CPC/PCA
> > > http://www.blm.gov/pca
> > > okwong@blm.gov
> > > 202-912-7232
> > >
> > > On Thu, Dec 18, 2014 at 10:21 AM, Herren, Vicki <vherren@blm.gov> wrote:
> > >
> > > > My opinion - use the existing Great Basin boundary already on file at the NOC.
> > > > Vicki

On Thu, Dec 18, 2014 at 9:54 AM, Froistad, Alisa <afroistad@blm.gov> wrote:

> Robin Checked in and wrote the following so I will see what I can find...
>
> "Worst case scenario on Great Basin spatial feature... Frank and Anthony created a 'west'/'great basin' boundary for the GRSG planning effort early on. It could be used as a fall back spatial feature if you have trouble correcting the shape file error- and would approximate the area (if not be exactly the same area), as described by native plants...plants used the planning area created- not the other way around."
>
> On Thu, Dec 18, 2014 at 7:52 AM, Kwong, Olivia <okwong@blm.gov> wrote:
>
>> It's an ecoregion. I'm not sure, as I don't do GIS at all, and received the files from else.
>>
>> Olivia
>>
>> **Olivia Kwong**
>> CPC/PCA
>> http://www.blm.gov/pca
>> okwong@blm.gov
>> 202-912-7232
>>
>> On Thu, Dec 18, 2014 at 9:46 AM, Froistad, Alisa <afroistad@blm.gov> wrote:
>>
>>> Good Morning Olivia,
>>>
>>> Thank you for you advice, that is what I will do if I cannot get it to work, but do know what the Great Basin Shape is of (i.e. a population boundary)?
>>>
>>> On Thu, Dec 18, 2014 at 7:44 AM, Kwong, Olivia <okwong@blm.gov> wrote:
>>>
>>>> I think if you can't get it to work, it would be okay to simply link it to the areas like the other entries.
>>>>
>>>> Olivia
>>>>
>>>> **Olivia Kwong**
>>>> CPC/PCA
>>>> http://www.blm.gov/pca
>>>> okwong@blm.gov
>>>> 202-912-7232
>>>>
>>>> On Thu, Dec 18, 2014 at 9:28 AM, Froistad, Alisa <afroistad@blm.gov>
>>>>
>>>>> Hi Vicki,
>>>>>
>>>>> Thank you for getting back to me. Do you know what the Great Basin a population boundary)?
>>>>>
>>>>> On Thu, Dec 18, 2014 at 7:24 AM, Vicki Herren <vherren@blm.gov>

> Any chance the NOC Has a spatial layer you can use in place of the
>
> Sent from my iPhone
>
> On Dec 18, 2014, at 8:48 AM, "Froistad, Alisa" <afroistad@blm.gov> wrote:
>
> > Good Morning,
> >
> > My apologies for the short notice by I am receiving an Error Opening Feature Class" message when trying to use the GreatBasinShape.shp for the CED data compilation. It looks like all the required files are in the ZIP folder so the only thought I have is that there somehow is a discrepancy between the number of records in the table (the .dbf appears to be empty). As soon as possible, could you check the shapefile on your end and if it works please re-zip and send it to me (Robin Sell is on leave). I am also trying to get IT to help me install a Shapefile Repair Tool that may fix the problem
> >
> > Thanks,
> > Alisa
> >
> > On Thu, Dec 11, 2014 at 11:15 AM, Kwong, Olivia <okwong@blm.gov> wrote:
> >
> > > Ah, I confused the effective with the completed attaching an updated excel with the HLC fields filled in for all the entries.
> > >
> > > Olivia
> > >
> > > **Olivia Kwong**
> > > CPC/PCA
> > > http://www.blm.gov/pca
> > > okwong@blm.gov
> > > 202-912-7232
> > >
> > > On Thu, Dec 11, 2014 at 1:10 PM, Sell, Robin wrote:
> > >
> > > > Vicki and Olivia-
> > > >
> > > > I can add the 'in perpetuity' changes to all plant completed HLC/ANDE fields for the 2 projects mentioned into the Master spreadsheet we already started. **I will still need the HLC fields for the remaining 4(?) projects - these need to be filled out for any effort 'in progress'.**

Alisa will have to convert the 2 shapefiles to the following her state review/data clean-up, but the folders for additional documents looks good. We will attach the rangewide spatial data for other projects.

Alisa may find additional info during the final help a lot.

Robin

On Thu, Dec 11, 2014 at 8:32 AM, Herren, Vicki <vherren@blm.gov> wrote:

> Thanks Olivia for the rapid response!
> Robin - please let us know if this now is standards we need to meet. Thanks.
> Vicki
>
> ---------- Forwarded message ----------
> From: **Kwong, Olivia** <okwong@blm.gov>
> Date: Thu, Dec 11, 2014 at 10:16 AM
> Subject: Re: National Plant GRSG data call- initial review
> To: "Herren, Vicki" <vherren@blm.gov>, "Margaret (Peggy) Olwell" <polwell@blm.gov>
>
> Vicki,
>
> I have filled in the HLC and ANDE items for the marked highly likely to be successful. The updated excel file is attached.
>
> Looked through the field explanation document have covered all of the required fields. I switched the project end dates to the next column over that says Yes to the project is in perpetuity rather than having an end date. I must have totally missed reading that column clearly when I filled it in last week!
>
> I think linking to the PPH/PGH for GRSG include shapefiles for the Great Basin and Colorado Plateau entries though, so those could be used for those, but we could make the argument that both of those projects have benefits rangewide so PPH/PGH for them would actually be fine.
>
> Olivia

Olivia Kwong
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On Thu, Dec 11, 2014 at 7:58 AM, Herren, Vicki <vherren@blm.gov> wrote:

> Paul - we'll handle this from DC.
>
> Robin - I will work with Olivia on this and get soon as we can. We may need to discuss some of the points you made.
>
> Vicki
>
> On Wed, Dec 10, 2014 at 4:55 PM, Sell, Robin wrote:
>
> > Peggy and Paul-
> >
> > All of your projects are marked as 'in end date of 12/31/2014 - IF efforts are 'in progress'- **all HLC (high likelihood of certainty) must be filled out**. I wasn't sure if your efforts were truly completed as of 12/31/14 (we might change the implementation field to completed then). It is also OK to insert an 'estimated finish date' for the finish columns.
> >
> > Also all projects, with '**highly likely to be need to have the ANDE columns populated** (I believe this is CO Plateau Native Plant Prgm & Nat'l Seed Strategy efforts).
> >
> > Please refer to the template help document starting on pg 9) to help answer the questions- all Y/N. **These are required fields and will prevent these records from being uploaded.**
> >
> > **We also plan to link these records to rangewide (spatial field) - will that work for you?**
> >
> > Thanks for your timely response. Alisa will after the states, but hopefully these are the key fields missing. Thanks for the documents/attachments in each effort folder - that was great! Questions, yell.
> >
> > Robin
> > 303.236.6337 (temp #)

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Vicki Herren
BLM National Sage-Grouse Coordinator
BLM Washington Office, Division of Fish and Conservation

202.912.7235 Desk
202.374.4597 Cell

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Vicki Herren
BLM National Sage-Grouse Coordinator (Acting)
BLM Washington Office, Division of Fish and Conservation

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> > > > > > *E-mail: afroistad@blm.gov*
> > > > > > *Phone: (303) 236-2268*
> > > > >
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> > > > > Vicki Herren
> > > > > BLM National Sage-Grouse Coordinator (Acting)
> > > > > BLM Washington Office, Division of Fish and Wildlife Conservation
> > > > > 202.912.7235 Desk
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> > > *Alisa Froistad*
> > > *Data Administrator*
> > > *Parallel Incorporated Contractor*
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Alisa Froistad
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From:	Quamen, Frank
Sent:	Tuesday, September 30, 2014 10:38 AM
To:	Kathryn Stangl
Subject:	Fwd: Compliance Maps
Attachments:	GreatBasin_SolarEnergy_GHPH_Mask_v2.pdf; GreatBasin_SolarEnergy_GHPH_Mask_Hatching_v2.pdf; GreatBasin_SolarEnergy_PAC_Mask_v2.pdf

---------- Forwarded message ----------
From: **Anthony Titolo** <atitolo@blm.gov>
Date: Tue, Sep 30, 2014 at 11:34 AM
Subject: Compliance Maps
To: "Quamen, Frank R" <fquamen@blm.gov>

Sorry for the delay, the network cut out on us twice.

Anthony J. Titolo

Sanborn Onsite GIS Analyst

Wildlife Habitat Spatial Analysis Lab

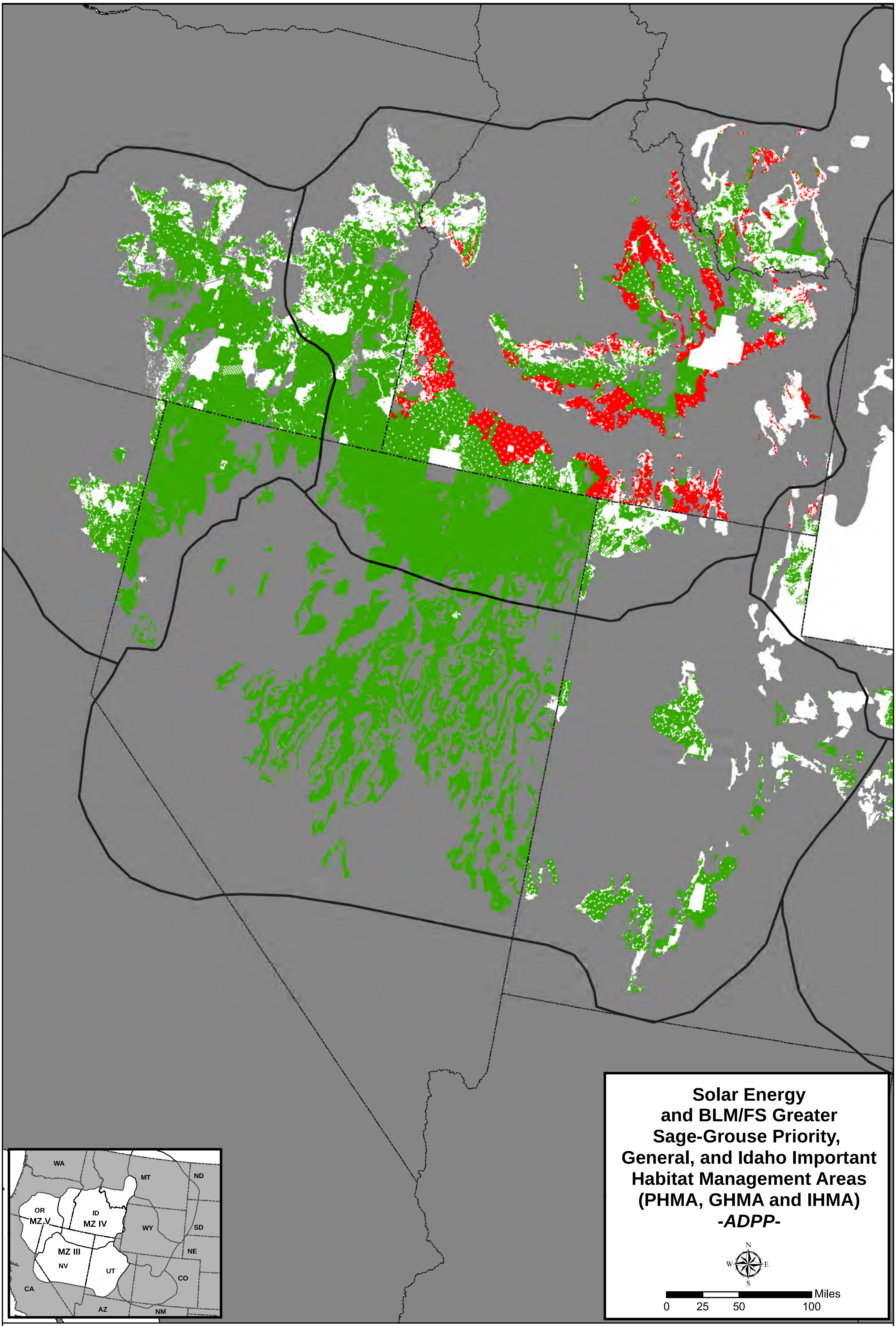
Division of Resource Services

NOC/BLM/DOI

303-236-0446

--
Frank Quamen, Wildlife Biologist
BLM National Operations Center

Denver Federal Center Building 40
303-236-6310



Solar Energy and BLM/FS Greater Sage-Grouse Priority, General, and Idaho Important Habitat Management Areas (PHMA, GHMA and IHMA)

-ADPP-

Legend

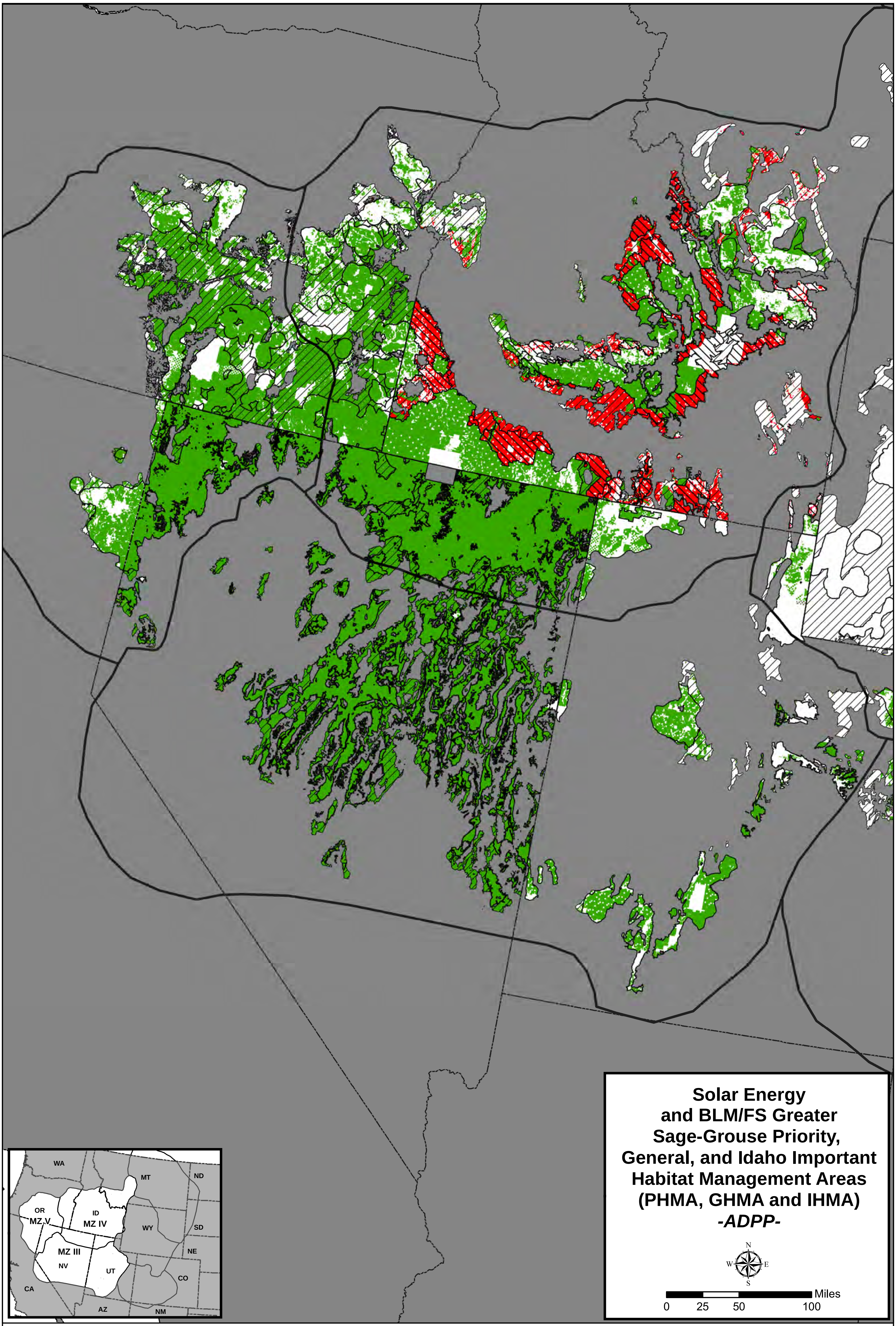
🟩 Compliant with National Policy Team Guidance

🟥 Non-Compliant with National Policy Team Guidance

▭ WAFWA Management Zones

⬚ State Boundaries

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT



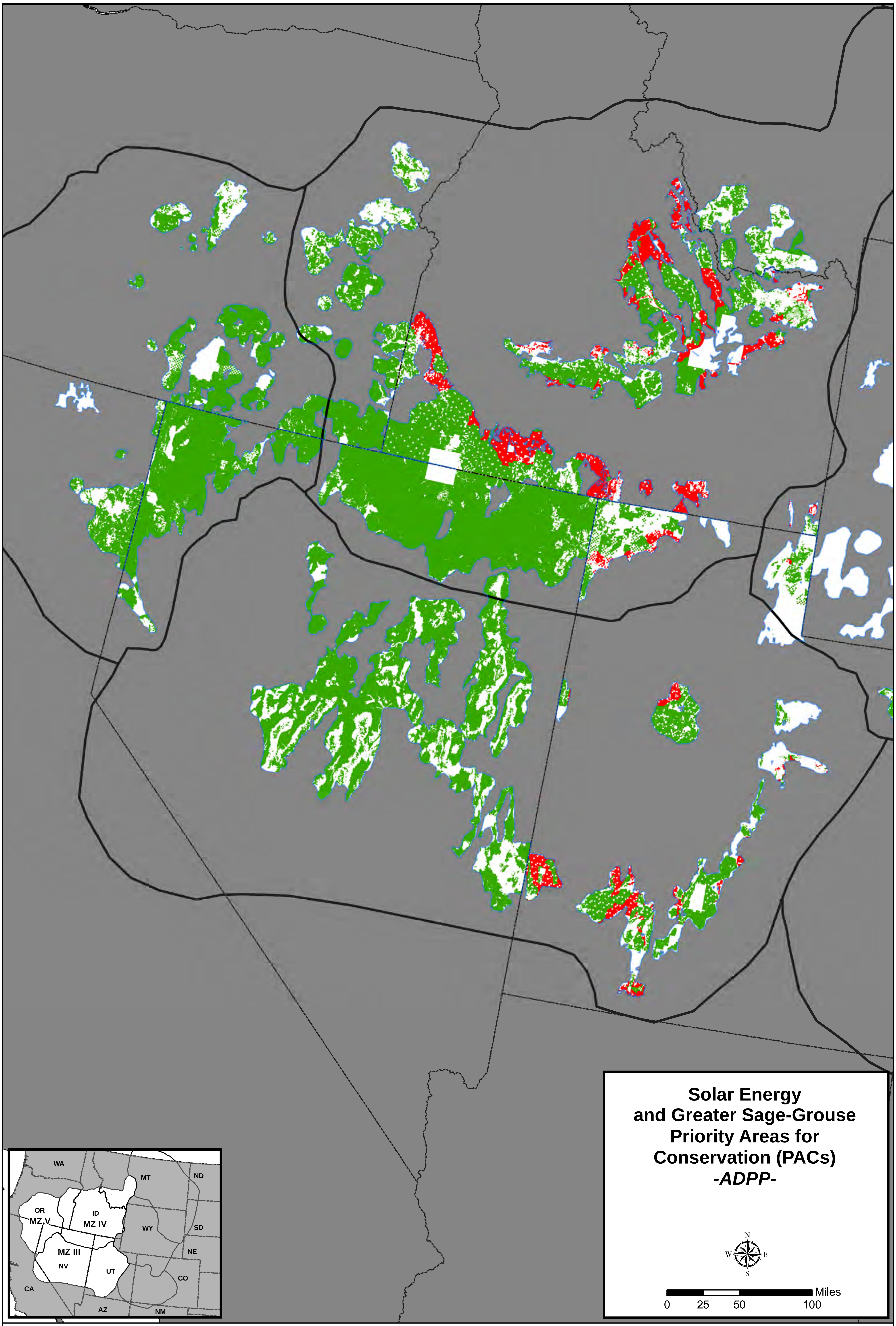
Solar Energy and BLM/FS Greater Sage-Grouse Priority, General, and Idaho Important Habitat Management Areas (PHMA, GHMA and IHMA)

-ADPP-

Legend

- 🟩 Compliant with National Policy Team Guidance
- 🟥 Non-Compliant with National Policy Team Guidance
- ☐ GRSG PHMA
- ▨ GRSG GHMA
- ▧ Idaho GRSG IHMA
- ▭ WAFWA Management Zones
- ┄ State Boundaries

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT



Solar Energy and Greater Sage-Grouse Priority Areas for Conservation (PACs)

-ADPP-

Legend

🟩 Compliant with National Policy Team Guidance

🟥 Non-Compliant with National Policy Team Guidance

☐ GRSG PACs

☐ WAFWA Management Zones

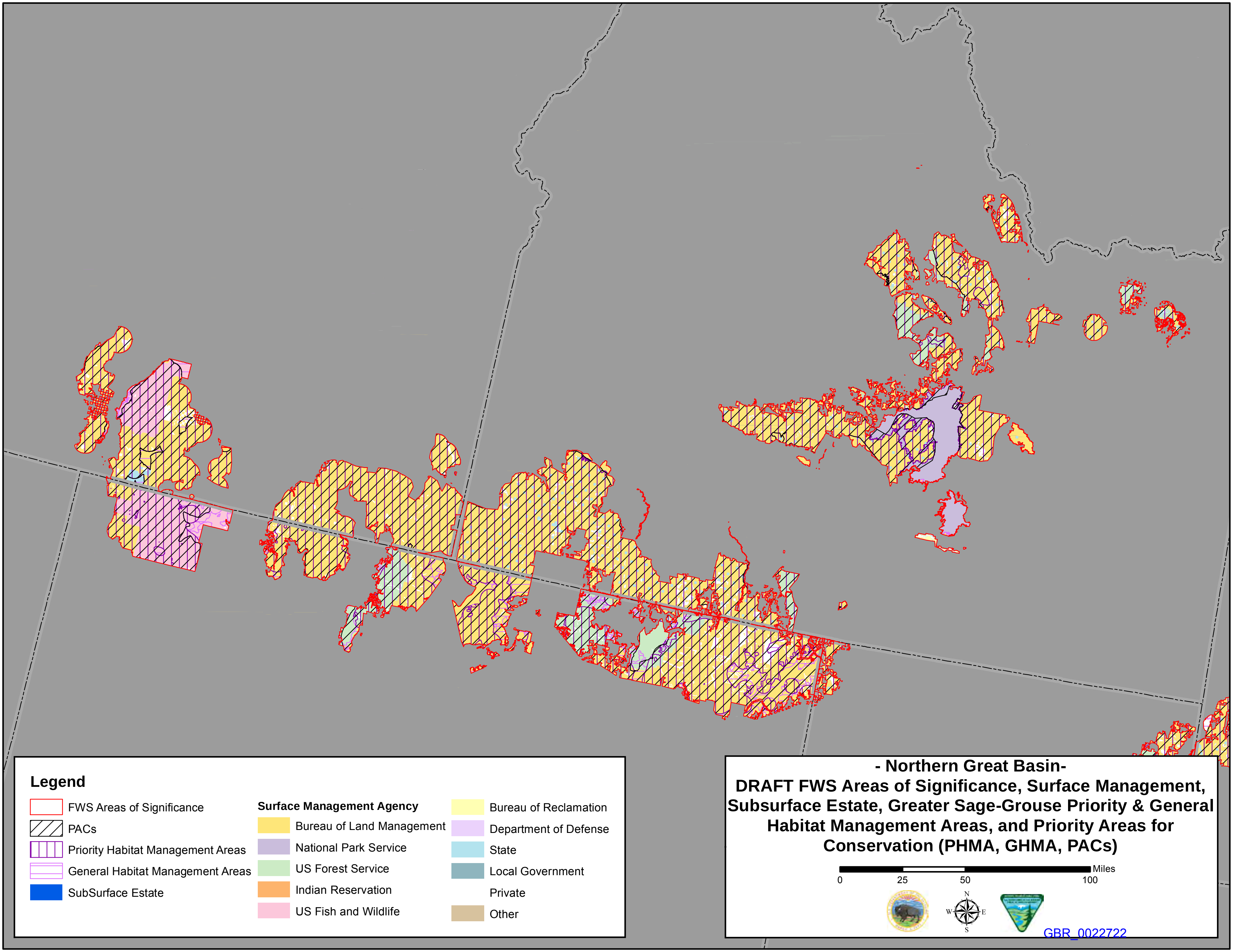
┆ State Boundaries

GBR_PUB_1602
8.2.b

From: Quamen, Frank
Sent: Monday, January 12, 2015 12:16 PM
To: Lauren Mermejo; Matthew Magaletti; Stephanie Carman; Vicki Herren
Subject: N Great Basin SFA dynamic pdf map
Attachments: AoS_PHMA_GHMA_PAC_SMA_SubSurf_NGB.pdf

--

Frank Quamen, Wildlife Biologist
BLM National Operations Center
Denver Federal Center Building 40
303-236-6310



- Northern Great Basin-
DRAFT FWS Areas of Significance, Surface Management, Subsurface Estate, Greater Sage-Grouse Priority & General Habitat Management Areas, and Priority Areas for Conservation (PHMA, GHMA, PACs)

Legend

- FWS Areas of Significance
- PACs
- Priority Habitat Management Areas
- General Habitat Management Areas
- SubSurface Estate

Surface Management Agency

- Bureau of Land Management
- National Park Service
- US Forest Service
- Indian Reservation
- US Fish and Wildlife
- Bureau of Reclamation
- Department of Defense
- State
- Local Government
- Private
- Other

PL_PUB_5581
8.2.b

From: Leisa Wesch
Sent: Thursday, February 12, 2015 11:35 AM
To: Matthew Magaletti
Subject: FW: Updated Land Tenure Map
Attachments: Land Tenure 02112015.pdf

From: Leisa Wesch [mailto:lwesch@blm.gov]
Sent: Wednesday, February 11, 2015 5:27 PM
To: Arlene Kosic
Cc: 'Sharp, Randy'; Lauren Mermejo
Subject: Updated Land Tenure Map

Arlene
Attached is the Land Tenure as discussed with Randy today.
I took your CA Lands Disposal and ran it against the PHMA/GHMA layer and removed those areas.
Then put it back with the NV Disposal layer for a complete Lands_Unavailable_Proposed

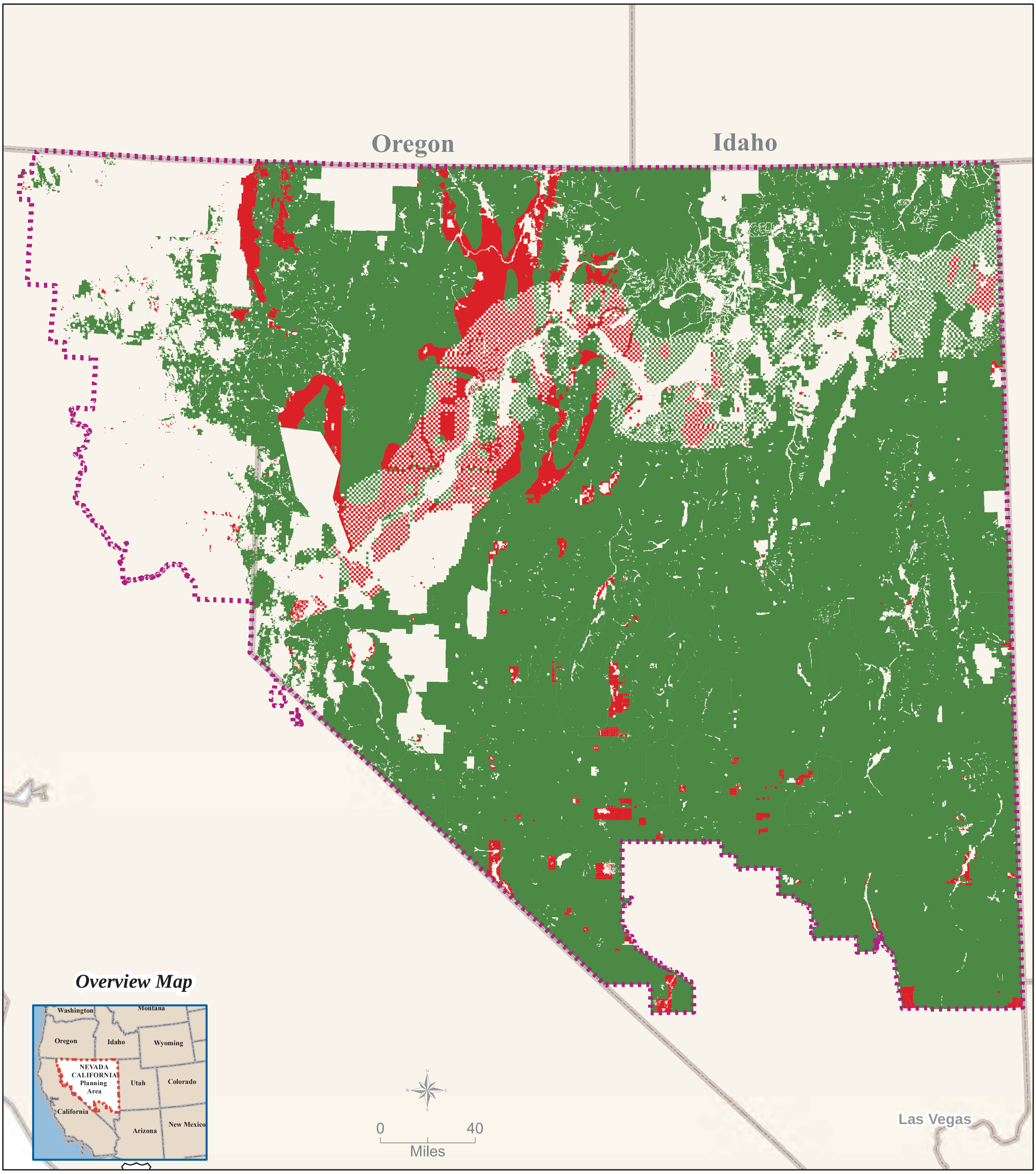
Please take a look at it and again your approval to this email will let Lauren know that it is complete.

If I missed the mark call me in the am. I will be in at 6am.

Thank you

Leisa Wesch
GIS Specialist – Greater Sage Grouse Project
BLM- NVSO
775-861-6421

NV-NECA GRSG Habitat
Land Tenure



Legend

Legend

🟥 NVCA_Lands_Disposal_Proposed

🟩 NVCA_Lands_Retention_Proposed

Date: 2/11/2015

Document Path: T:\NV\GIS_Work\Multi-District_Project\RMP\GSG_RMP_Amend\1_GRSG_Preferred_FEIS\MXDs\FEIS MXDs\FEIS Review Data\Land Tenure.mxd

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/AES/058711

OCT 27 2014

GBR_PUB_0706
9.1
10/1/2015

Memorandum

To: Director, Bureau of Land Management
Chief, U.S. Forest Service

From: Director

Subject: Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes

Pursuant to our October 1, 2014 leadership discussion regarding the federal land management planning process for greater sage-grouse (sage-grouse) conservation and as a continuation of our ongoing coordination and advice regarding your land management plan revisions and amendments, we are providing recommendations to further assist your agencies in the important management decisions you are currently finalizing. During the ongoing coordination effort for the planning process, we have provided conservation advice in the form of the 2013 Conservation Objectives Team final report (COT report), our comments on the draft federal plans including comprehensive analyses of alternatives, and the National Policy Team (NPT) Guidance, as well as other consultative activities.

This memorandum and associated maps respond to a request from the Bureau of Land Management (BLM) to identify a subset of priority habitat most vital to the species persistence, within which we recommend the strongest levels of protection. The areas we have identified on the attached map are a subset of the already identified Priority Habitat Management Areas (PHMA). The areas we have identified within PHMA represent recognized "strongholds" for the species that have been noted and referenced by the conservation community as having the highest densities of the species and other criteria important for the persistence of the species. For example, the Western Association of Fish and Wildlife Agencies' 2004 Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats (Connelly, et al., 2004; Figure 13.1, attached) included a similar geographic distribution of these stronghold areas for breeding populations of sage-grouse. In addition, in 2010, Doherty et al. produced the first sets of breeding density maps, which clearly illustrate high densities of breeding birds exist in very similar locations. Most recently, Chambers et al. (2014) produced maps of relative resilience and resistance to invasive species and wildfire impacts to sagebrush habitats that also align closely with the subset of priority habitats we have identified in the Great Basin region.

Strong, durable, and meaningful protection of federally administered lands in these areas will provide additional certainty and help obtain confidence for long-term sage-grouse persistence. To be clear, enhanced protections in the stronghold areas do not obviate the need to follow the NPT guidance in the entirety of PHMAs (and in PACs in those instances where gaps between PHMA and PACs exist) and in general habitat.

We have previously advised and continue to recommend that BLM and US Forest Service (Forest Service) land management plans be designed to meet the objectives outlined in COT report. The attached maps highlight areas where it is most important that BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species.

Criteria, Methodology and Rationale

We used the following criteria to identify areas within PHMAs in which the most conservative approach should be applied:

- Existing high-quality sagebrush habitat for sage-grouse;
- Highest breeding densities of sage-grouse;
- Areas identified in the literature as essential to conservation and persistence of the species (Knick and Hanser 2011); and,
- A preponderance of current federal ownership, and in some cases, adjacent protected areas that serve to anchor the conservation importance of the landscape.

In addition, we evaluated these areas against related efforts by partner organizations (NatureServe and Conservation Biology Institute) to determine relative agreement between analyses. Using Data Basin, a mapping and analysis platform, we verified our analysis is consistent with landscape-level sage-grouse conservation opportunities and needs, as defined by the above criteria as well as additional considerations, including the modeled "velocity" of climate change onset in various parts of the range and the potential for fire and invasive species impacts on sage-grouse habitat. In the process of this comparative exercise, we determined there was generally good spatial relationship between these areas and other important habitat conservation values in the sagebrush-steppe ecosystem, including shrub-steppe passerine birds (Hanser and Knick 2011) and mule deer winter range (identified by the Western Governors Association Crucial Habitat Assessment Tool.

Rangewide Map (Map 1)

See below for regional maps and individual unit descriptions.

Great Basin Region (Map 2)

- **Southern Idaho/northern Nevada**: This general area is comprised almost entirely of federal surface lands. The area contains five designated federal Wilderness areas, and protected areas for bighorn sheep conservation. Sage-grouse breeding densities are very high.

- **North-central Idaho**: This area is anchored by Craters of the Moon National Monument, is comprised of mostly federal surface land ownership, and has a high density of breeding sage-grouse.

- **Areas adjacent to the Sheldon-Hart Mountain National Wildlife Refuge Complex, Oregon and Nevada:** This area occurs predominately on federal surface lands, and includes several Wilderness Study Areas (WSAs). It contains some of the highest sage-grouse breeding densities in Oregon and both of these national wildlife refuges (NWRs) are actively managing for sage-grouse conservation.

- **Southeastern Oregon/north-central Nevada:** This area is predominately federal surface lands and contains five designated WSAs. Breeding densities of sage-grouse are high.

Rocky Mountain Region (Maps 3 and 4):

- **Southwestern/south-central Wyoming** (Map 3): This expansive area is predominately federal surface estate and represents some of the best remaining sage-grouse habitat within the entire range of the species. The area includes four currently designated WSAs, one federal Wilderness area, and several areas managed for historic and cultural resources (which exclude development). Seedskadee National Wildlife Refuge is in the vicinity.

- **Bear River Watershed** (Northeastern Utah/Southwestern Wyoming, Map 3): This area has a high density of breeding sage-grouse. Cokeville Meadows NWR is located nearby.

- **North-central Montana** (Map 4): This area comprises the highest breeding sage-grouse densities in Montana. It follows the Missouri River, is adjacent to Charles M. Russell NWR. This area also provides wintering habitat for sage-grouse migrating seasonally from Alberta, Canada, where the species listed as endangered under the Canadian Species at Risk Act.

References

U.S. Fish and Wildlife Service. 2013. Greater sage-grouse (*Centrocercus urophasianus*) Conservation objectives: final report. U.S. Fish and Wildlife Service, Denver, CO.

Connelly, J.W., S.T. Knick, M.A. Schroeder, and S.J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, WY.

Doherty, K.E., J.D. Tack, J.S. Evans, and D.E. Naugle. 2010. Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning. BLM Completion Report. Interagency Agreement # L10PG00911.

Chambers, J. C.; Pyke, D. A.; Maestas, J. D.; Pellant, M.; Boyd, C. S.; Campbell, S. B.; Espinosa, S.; Havlina, D. W.; Mayer, K. E.; Wuenschel, A. 2014b. Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: A strategic multi-scale approach. Gen. Tech. Rep. RMRS-GTR-326. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 73p.

Knick, S.T., and S.E. Hanser. 2011. Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes. Pp. 383 – 405 *in* S.T. Knick and J.W. Connelly (editors). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38), University of California Press, Berkeley, CA.

Hanser, S.E. and Knick, S.T. 2011. Greater Sage-Grouse as an Umbrella Species for Shrub and Passerine Birds: A Multi-Scale Assessment. Pp. 475 – 487 *in* S.T. Knick and J.W. Connelly (editors). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38), University of California Press, Berkeley, CA.

References, cont.

State Wildlife Agencies of the Western United States. West-wide Crucial Habitat Data Set. Western Governors' Crucial Habitat Assessment Tool: Mapping Fish and Wildlife Across the West. Western Governors' Association. Published October 15, 2014. Accessed October 15, 2014. http://www.westgovchat.org

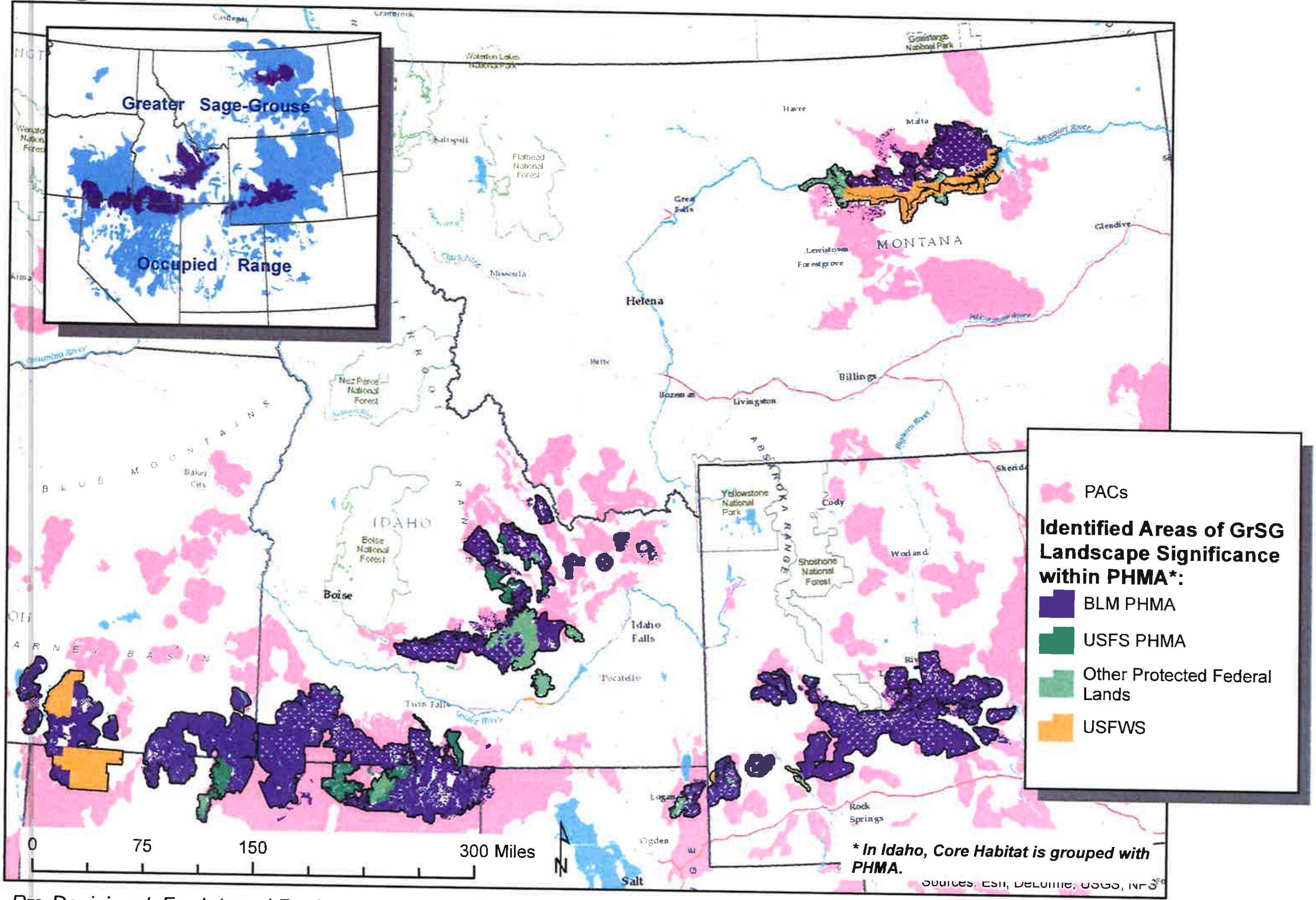
Data Basin, *see* http://databasin.org/

Enclosures

Maps 1-4

Figure 13.1, from Connelly, et al, 2004.

Identified Areas of GrSG Landscape Significance within BLM/USFS PHMA: Rangewide

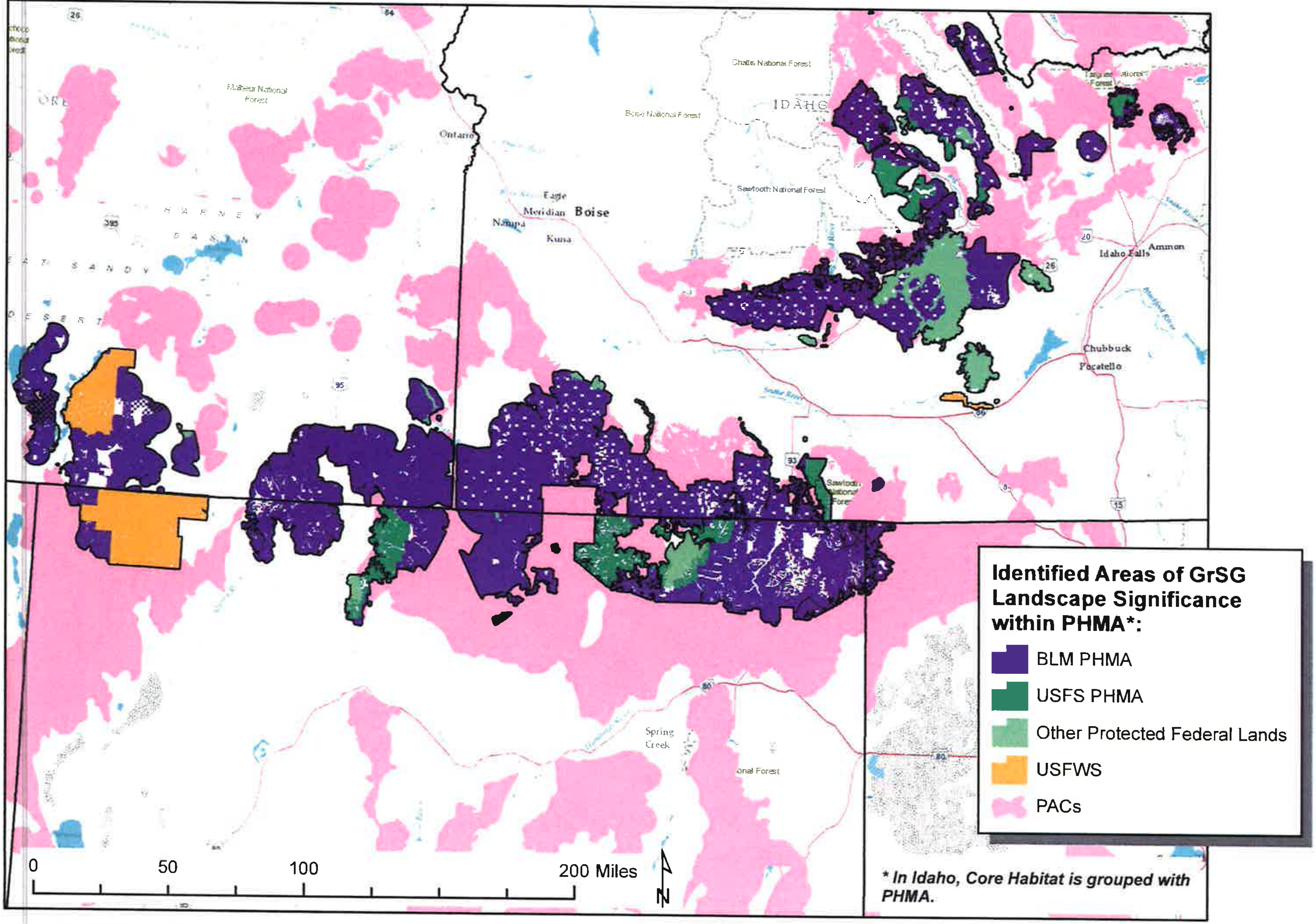


* In Idaho, Core Habitat is grouped with PHMA.

Sources: Esri, DeLorme, USGS, NPS

Pre-Decisional; For Internal Review Purposes Only. Do Not Distribute.
PHMA current as of October, 2014.

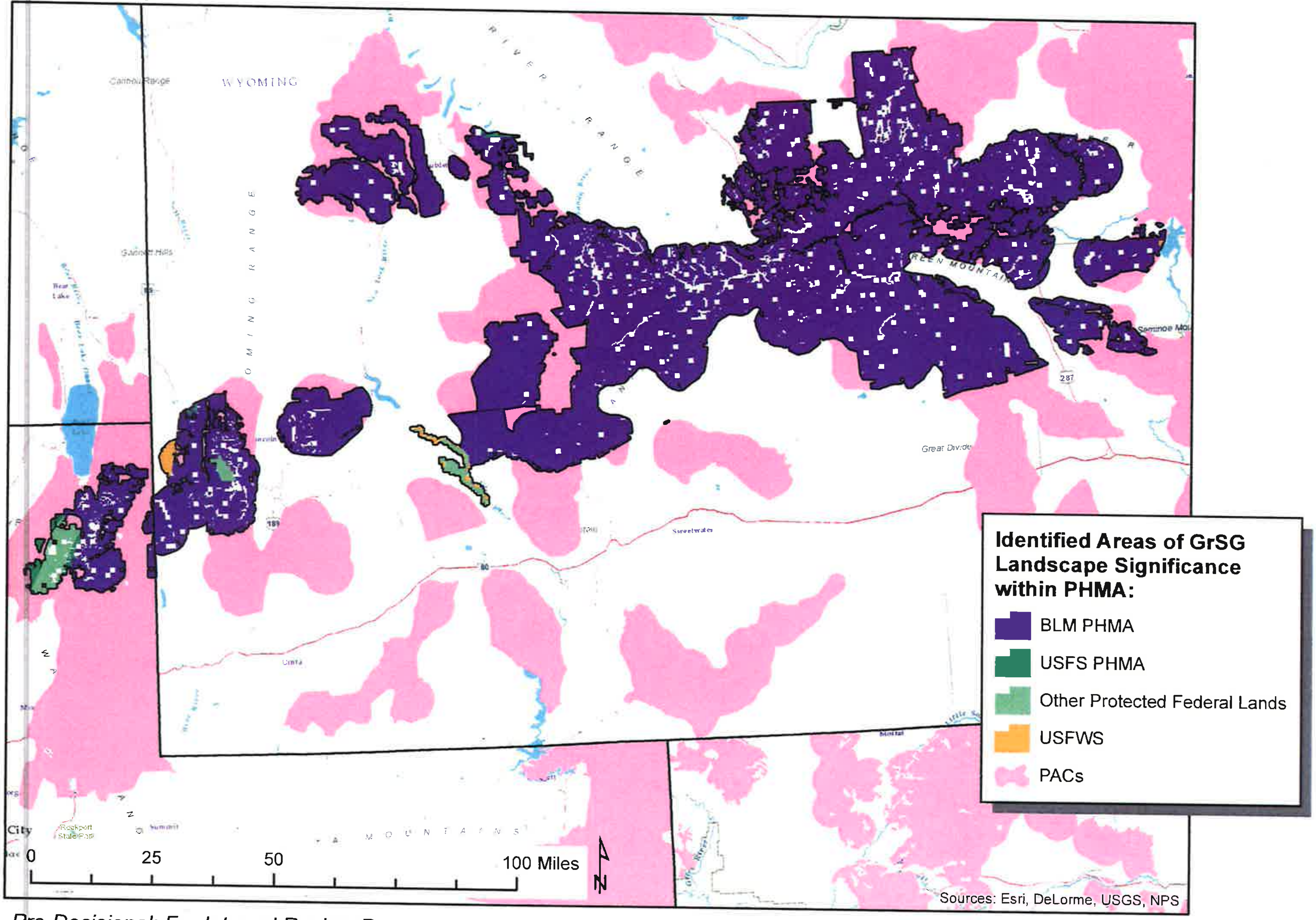
Identified Areas of GrSG Landscape Significance within BLM/USFS PHMA: Northern Great Basin



* In Idaho, Core Habitat is grouped with PHMA.

Pre-Decisional; For Internal Review Purposes Only. Do Not Distribute.
PHMA current as of October, 2014.

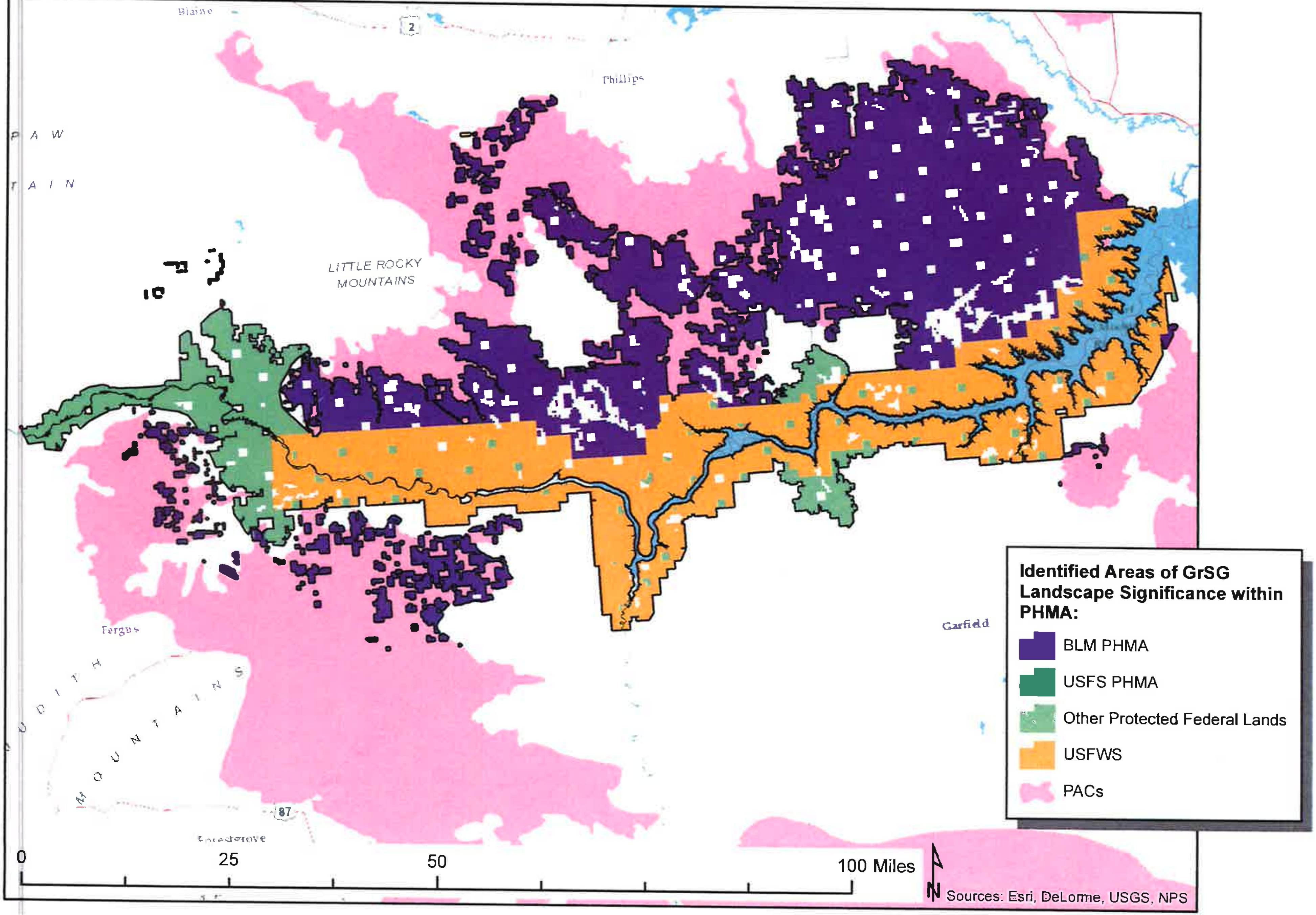
Identified Areas of GrSG Landscape Significance within BLM/USFS PHMA: Wyoming Basin



Sources: Esri, DeLorme, USGS, NPS

Pre-Decisional; For Internal Review Purposes Only. Do Not Distribute.
PHMA current as of October, 2014.

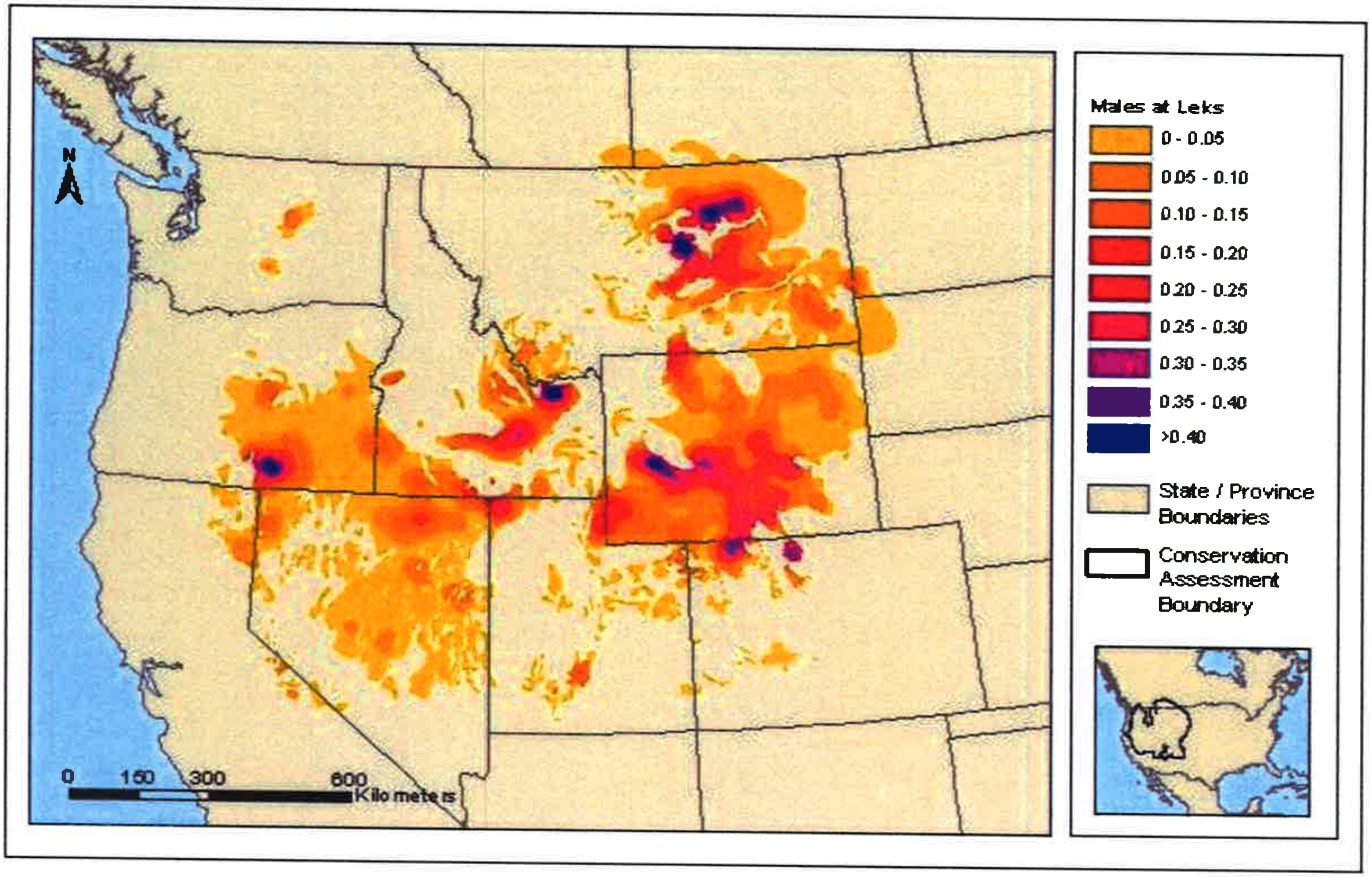
Identified Areas of GrSG Landscape Significance within BLM/USFS PHMA: North Central Montana



Sources: Esri, DeLorme, USGS, NPS

Pre-Decisional; For Internal Review Purposes Only. Do Not Distribute.
PHMA current as of October, 2014.

Figure 13.1 Strongholds for breeding populations of sage-grouse in western North America.



Note: The darker shades represent the greatest densities of males/km^2

Source: Connelly, J.W., Knick, S.T., Schroeder, M.A., and Stiver, S.J., 2004. Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of

Idaho and Southwestern Montana
Nevada and Northeastern California
Oregon
Utah

Prepared by:
US Department of the Interior
Bureau of Land Management
Washington, DC

September 2015

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MISSION STATEMENT

The BLM manages more than 245 million acres of public land, the most of any Federal agency. This land, known as the National System of Public Lands, is primarily located in 12 Western states, including Alaska. The BLM also administers 700 million acres of sub-surface mineral estate throughout the nation. The BLM's mission is to manage and conserve the public lands for the use and enjoyment of present and future generations under our mandate of multiple-use and sustained yield. In Fiscal Year 2014, the BLM generated $5.2 billion in receipts from public lands.

[Insert BLM WO Letterhead]

In Reply Refer To:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah).

This ROD approves the four Great Basin Region ARMPAs, which are part of the National GRSG Conservation Strategy that was initiated on December 11, 2011. The Bureau of Land Management (BLM) initiated the conservation strategy in response to the US Fish and Wildlife Service's (FWS's) March 2010 "warranted, but precluded" Endangered Species Act listing petition decision. In this decision, the FWS identified the inadequacy of regulatory mechanisms as a significant threat to GRSG. Resource management plan (RMP) conservation measures were identified as the BLM's principal regulatory mechanism.

Combined, the BLM and the Forest Service administer approximately 62 percent of the GRSG habitat across the remaining range of the species. The National GRSG Conservation Strategy has been coordinated under two administrative planning regions across this landscape: the Rocky Mountain Region and the Great Basin Region. The regions were drawn roughly to correspond with the threats that the FWS identified in the 2010 listing decision, along with the Western Association of Fish and Wildlife Agencies' Management Zones framework (Stiver et al. 2006; see **Figure 1-4**, Greater Sage-Grouse Priority Areas for Conservation, Populations, and WAFWA Management Zones, of this ROD).

Range-wide, the BLM prepared 15 environmental impact statements (EISs), with associated proposed land use plan amendments and revisions in the Rocky Mountain and Great Basin region[illegible]he Forest Service was involved in the development of five EISs: two in the Rocky Mountain Region and three in the Great Basin. Each agency prepared two RODs: one for the approval of land use plan revisions or amendments in each of the regions covered by the GRSG Conservation Strategy. Thus, the BLM and the Forest Service prepared a total of four RODs to implement the Federal GRSG conservation plans across the remaining range of the species.

This ROD applies to the BLM ARMPAs in the Great Basin Region. However, the complete strategy for GRSG conservation on BLM-administered and National Forest System lands across the remaining range of the species consists of this ROD (and associated plans), in conjunction with the BLM ROD for the Rocky Mountain Region and the two Forest Service RODs, one for each region.

The BLM's ARMPAs provide a landscape-level, science-based, coordinated, collaborative strategy for addressing threats to GRSG and its habitat. This strategy was designed to address threats identified in the FWS's 2010 "warranted, but precluded" decision. In addition, the strategy was guided by over a decade of research, analyses, and recommendations for GRSG conservation, including the Conservation Objectives Team Report and the BLM National Technical Team Report. These reports were developed through a collaboration of state and Federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the US Geological Survey, the Forest Service, and state and other partners were fundamental to developing these ARMPAs.

It is important to note that this ROD and these ARMPAs apply only to BLM-administered lands, including BLM-administered subsurface mineral estate. Throughout the GRSG planning process, the Forest Service has been a cooperating agency on the Idaho and Southwestern Montana, the Nevada and Northeastern California, and the Utah planning efforts. These Draft RMPAs/EISs and Proposed RMPAs/Final EISs for the Great Basin sub-regions included proposed GRSG management direction for National Forest System lands in Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah. As noted above, the Forest Service has completed two separate RODs and associated land and resource management plan amendments under its planning authorities.

The Federal Land Policy and Management Act requires that resource management plans for managing public lands be developed and maintained, and, as appropriate, revised. The National Environmental Policy Act requires Federal agencies to prepare an EIS for major Federal actions significantly affecting the quality of the human environment. In fulfilling these requirements, the Draft RMPAs/EISs were published in the fall of 2013. They incorporated analysis and input provided by the following:

- The public
- Local, State, and other Federal agencies and organizations
- Native American tribes
- Cooperating agencies
- BLM resource specialists

Ninety-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 unique letters submitted on all four Great Basin Region Draft RMPAs/EISs. The BLM and Forest Service reviewed, summarized, and took into consideration these comments when preparing the Proposed RMPAs/Final EISs.

The Proposed RMPAs/Final EISs were made available on May 29, 2015, for a 60-day Governor's consistency review and 30-day protest period. The BLM received consistency review letters from governors of California, Idaho, Montana, Nevada, Oregon, and Utah in the Great Basin Region. The BLM has worked closely with these States to address their concerns and to resolve inconsistencies where possible. Across all four sub-regions in the Great Basin Region, 133 protest submission letters were received from government entities, private citizens, nongovernmental organizations, and other stakeholders; 124 of these submissions contained valid protest issues, pursuant to 43 Code of Federal Regulations 1610.5-2, and were addressed in the Director's Protest Resolution Reports. These reports are available on the Internet at http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

The BLM Director and the Assistant Secretary, Land and Minerals Management, now approve the attached RMPAs as the land use plans that will guide future land and resource management within GRSG habitat in the Great Basin Region for the life of the plan amendments. The ARMPAs will benefit GRSG and over 350 other species of wildlife that depend on healthy sagebrush-steppe landscapes, while maintaining multiple uses, including grazing and recreation.

Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse internet website, http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, cooperating agencies; local, State, and other Federal agencies, and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented.

Sincerely,

Neil Kornze
BLM Director

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

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SUMMARY

This Record of Decision (ROD) is the culmination of an unprecedented effort to conserve Greater Sage-Grouse (GRSG) habitat on public lands administered by the Bureau of Land Management (BLM). It is consistent with the BLM's multiple-use and sustained yield mission and the joint objective established by Federal and State leadership through the GRSG Task Force to conserve GRSG habitat on Federal, State, and private land such that additional protections under the Endangered Species Act may be avoided.

In response to a 2010 determination by the US Fish and Wildlife Service (FWS) that the listing of the GRSG under the Endangered Species Act was "warranted, but precluded" by other priorities, the BLM, in coordination with the US Department of Agriculture Forest Service developed a landscape-level management strategy, based on the best available science, that was targeted, multi-tiered, coordinated, and collaborative. This strategy offers the highest level of protection for GRSG in the most important habitat areas. It addresses the specific threats identified in the 2010 FWS "warranted, but precluded" decision and the FWS 2013 Conservation Objectives Team (COT) Report.

This ROD and Approved Resource Management Plan Amendments (ARMPAs) are for the Great Basin Region GRSG Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. They include GRSG habitat management direction that avoids and minimizes additional disturbance in GRSG habitat management areas. Moreover, they target restoration of and improvements to the most important areas of habitat. Management under the ARMPAs is directed through land use allocations that apply to GRSG habitat. These allocations accomplish the following:

- Eliminate most new surface disturbance in the most highly valued sagebrush ecosystem areas identified as Sagebrush Focal Areas
- Avoid or limit new surface disturbance in Priority Habitat Management Areas, of which Sagebrush Focal Areas are a subset
- Minimize surface disturbance in General Habitat Management Areas

In addition to protective land use allocations in habitat management areas, the ARMPAs include a suite of management actions, such as establishing disturbance limits, GRSG habitat objectives, mitigation requirements, monitoring protocols, and adaptive management triggers and responses. They also include other conservation measures that apply throughout designated habitat management areas. The cumulative effect of these measures is to conserve, enhance, and restore GRSG habitat across the remaining range of the species in the Great Basin and to provide greater certainty that BLM resource management plan decisions in GRSG habitat in the Great Basin Region can lead to conservation of the GRSG and other sagebrush-steppe associated species in the region.

The targeted land use plan protections presented in this ROD and ARMPAs not only protect the GRSG and its habitat but also over 350 wildlife species associated with the sagebrush-steppe ecosystem. This is widely recognized as one of the most imperiled ecosystems in North America. In addition to protecting habitat, reversing the slow degradation of this valuable ecosystem will also benefit local economies and a variety of rangeland uses, including recreation and grazing. This also will safeguard the long-term sustainability, diversity, and productivity of these important and iconic landscapes.

This conservation strategy has been developed in conjunction with the 10 States in which the ARMPAs in the Great Basin and the plans in the Rocky Mountain Region apply. In combination with additional State and Federal actions underway and in development, the strategy represents an unprecedented coordinated collaboration among Federal land management agencies and the States to manage an entire ecosystem and associated flora and fauna. The goal is to achieve the COT Report objective of "conserv[ing] the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future." [Dan Ashe. Transmittal letter to COT Report. 2013].

TABLE OF CONTENTS

Chapter Page

TABLE OF CONTENTS *(continued)*

TABLES

FIGURES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS	Full Phrase
AML	appropriate management level
ARMPA	Approved Resource Management Plan Amendment
BLM	Bureau of Land Management
BSU	biologically significant unit
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COT	Conservation Objectives Team
EIS	environmental impact statement
ESA	Endangered Species Act
FIAT	Fire and Invasives Assessment Team (also Fire and Invasives Assessment Tool)
FLPMA	Federal Land Policy and Management Act
FR	*Federal Register*
FWS	United States Fish and Wildlife Service
GHMAs	General Habitat Management Areas
GRSG	Greater Sage-Grouse
IHMAs	Important Habitat Management Areas
IM	instruction memorandum
MOU	memorandum of understanding
MZ	management zone
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NSO	no surface occupancy
NTT	National Technical Team
OHMAs	Other Habitat Management Areas
OHV	off-highway vehicle
PACs	Priority Areas for Conservations
PGH	preliminary general habitat
PHMAs	Priority Habitat Management Areas
PPH	preliminary priority habitat
RDF	required design feature
RMP	resource management plan
RMPA	resource management plan amendment
ROD	Record of Decision
ROW	right-of-way
SFAs	sagebrush focal areas
SHPO	State Historic Preservation Officer
USGS	United States Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WHBs	wild horses and burros

1. INTRODUCTION

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CHAPTER 1
INTRODUCTION

This Record of Decision (ROD) approves the United States (US) Department of the Interior, Bureau of Land Management's (BLM's) attached approved resource management plan amendments (ARMPAs) for the Great Basin Region GRSG Sub-Regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPAs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM-administered lands.

The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA; 43 United States Code [USC], Section 1701 et seq.), BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1600), and other applicable laws. The BLM prepared environmental impact statements (EISs) in compliance with the National Environmental Policy Act (NEPA; 42 USC, Sections 4321-4347), as amended, and the Council on Environmental Quality's (CEQ's) and the US Department of the Interior's regulations for implementing the procedural provisions of NEPA (40 CFR 1500.1 et seq. and 43 CFR 46.01 et seq., respectively).

Throughout the GRSG planning process, the Forest Service has been a cooperating agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The Forest Service has completed two separate RODs with associated resource management plan amendments under their planning authorities, which are available at http://www.fs.usda.gov/r4/.

This ROD, in conjunction with the ARMPs and ARMPAs approved through the Rocky Mountain ROD, constitute BLM land use planning decisions to conserve the GRSG and its habitats throughout its remaining range that is administered by the BLM under authority of FLPMA. The efforts of the BLM, in coordination with the Forest Service on National Forest System lands within the remaining range of the species, constitute a coordinated strategy for conserving the GRSG and the sagebrush-steppe ecosystem on most Federal lands on which the species depends. These decisions complement those implemented by Federal agencies through *An Integrated Rangeland Fire Strategy: Final Report to the Secretary of the Interior*

(US Department of the Interior 2015) and the Sage Grouse Initiative, as well as those implemented by State and local governments, private landowners, and other partners.

1.1 GREAT BASIN REGION PLANNING AREA

The Great Basin Region Planning Area is composed of four sub-regions: the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah.(see **Figure 1-1**, Great Basin Region Greater Sage-Grouse Sub-Regions). The BLM prepared a separate EIS for each of these sub-regions, and each sub-region conducted its own planning effort, with input from local cooperators, stakeholders, and members of the public. The sub-regional boundaries were constructed to align with BLM administrative offices, state boundaries, and areas that share common threats to GRSG and its habitat. The boundaries for these sub-regions largely coincide with zones III, IV, and V identified by the *Western Association of Fish and Wildlife Agencies (WAFWA) Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006) to delineate management zones (MZs) with similar ecological and biological issues.

The Great Basin Region Planning Area boundaries include all lands regardless of jurisdiction (see **Figure 1-2**, Great Basin Region Planning Area). **Table 1-1** outlines the amount of surface acres that are administered by specific Federal agencies, States, local governments, and privately owned lands in the four sub-regions that make up the Great Basin. The Planning Area also includes other BLM-administered lands that are not identified as habitat management areas for GRSG. The ARMPAs generally do not establish any additional management for these lands outside of GRSG habitat management areas, and they will continue to be managed according to the existing land use plans for these Planning Areas.

Table 1-1
Land Management in the Great Basin Planning Area

Surface Land Management	Nevada/NE California	Idaho/SW Montana	Utah	Oregon	Great Basin Total
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,597,500**
FWS	805,900	81,400	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other Federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,300**	**48,209,900**	**31,656,200**	**194,208,900**

Source: BLM GIS 2015
Note: Acres have been rounded to the nearest hundredth.

Figure 1-1
Great Basin Region Greater Sage-Grouse Sub-Regions

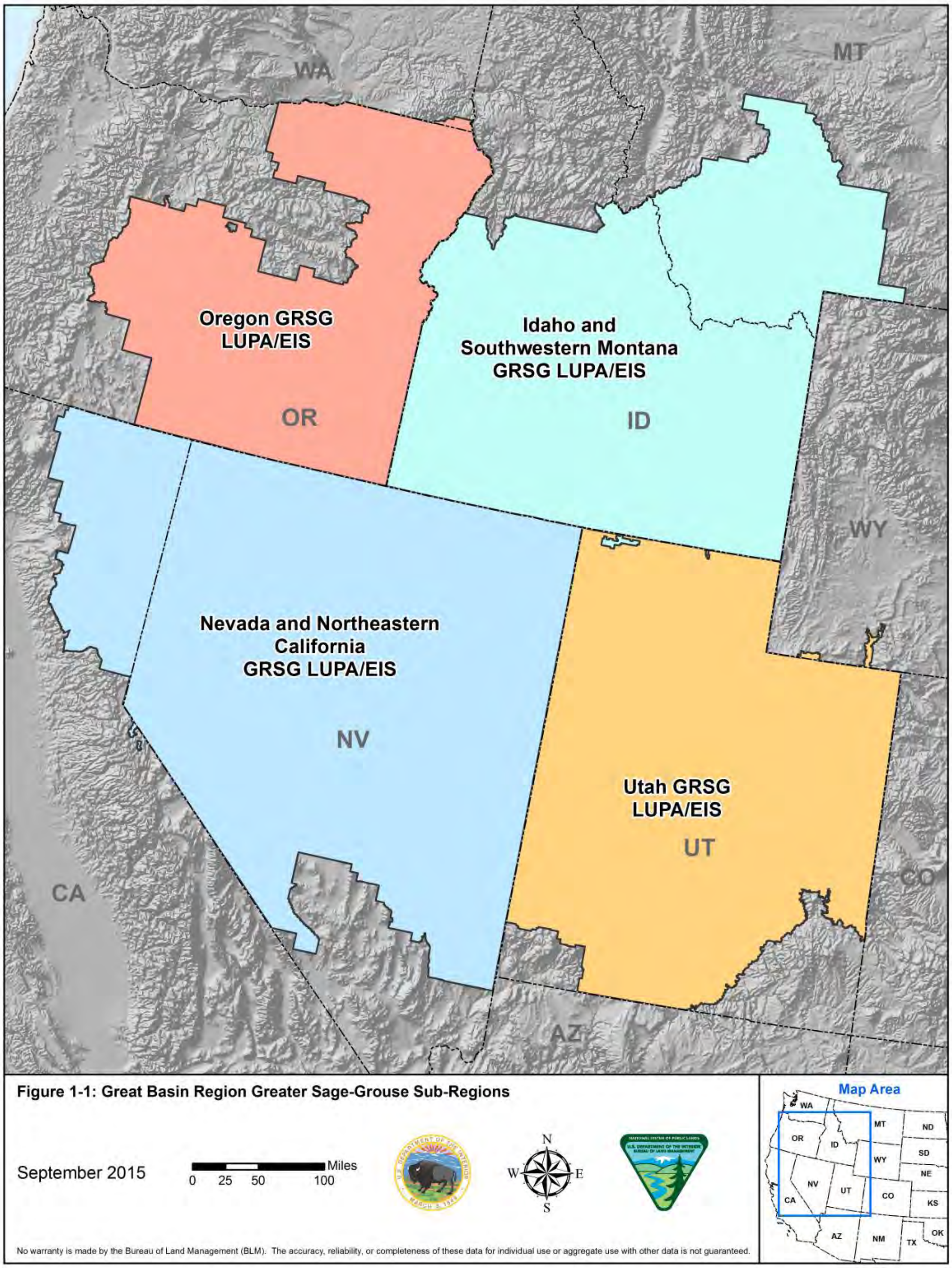
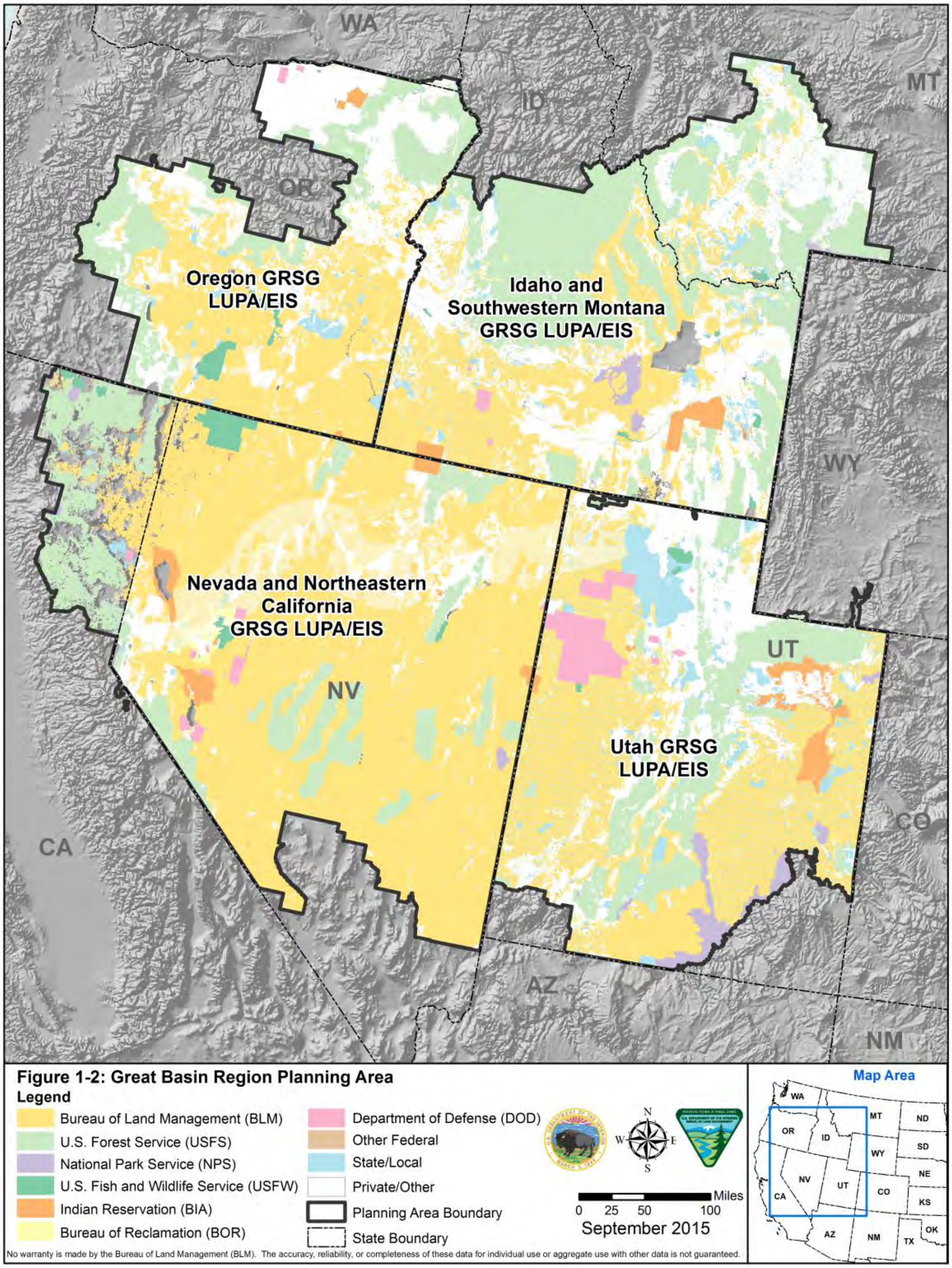


Figure 1-2
Great Basin Region Planning Area



The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure 1-3**, Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas [BLM-administered]), including surface and split-estate lands where the BLM has subsurface mineral rights. For a description of these habitat management areas, refer to **Section 1.5**.

1.2 EARLY GRSG CONSERVATION EFFORTS

Currently, GRSG occupy an estimated 56 percent of the historically occupied range. The BLM manages most of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State populations). The BLM and other wildlife conservation agencies and organizations have been conserving GRSG habitat for many years. This provides an important foundation for the GRSG conservation strategy that guides these plans.

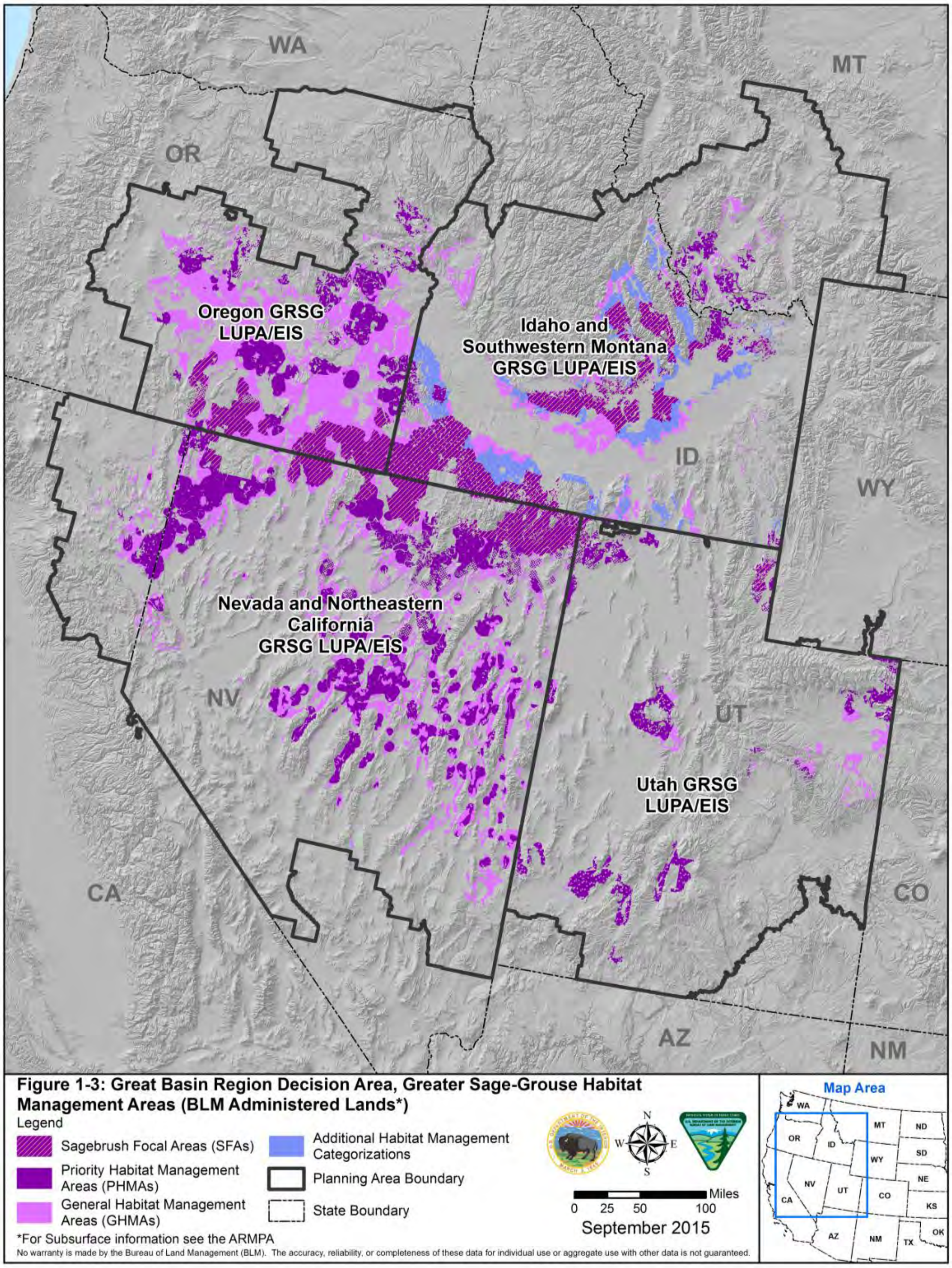
The WAFWA 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* (Connelly et al. 2004) was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, which includes contributions from the BLM, was to present an unbiased and scientific assessment of dominant issues and their effects on GRSG populations and sagebrush habitats.

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the US Fish and Wildlife Service (FWS), the Forest Service, the US Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006), with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The strategy outlined the critical need to develop the associations among local, State, provincial, tribal, and Federal agencies, nongovernmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats that they depend on. The catalyst for this was widespread concern for declining populations and reduced distribution of GRSG. http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation and to summarize the BLM's ongoing conservation efforts. A product of this investigation was one of the first range-wide priority habitat maps for GRSG that referred to "key habitat." At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a memorandum of understanding (MOU) by the WAFWA, the BLM, FWS, USGS in the US Department of the Interior, and the Forest Service and Natural Resources Conservation Service (NRCS) in the US Department of Agriculture. The MOU's purpose was to provide for cooperation among the participating State and Federal land managers and wildlife management and science agencies to conserve and manage GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the western United States.

Figure 1-3
Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas (BLM-administered Lands)



In 2010, the BLM commissioned a project to map and model breeding bird densities of GRSG across the West. It convened a conference with State wildlife agencies to coordinate the lek survey data needed for this project. Through an agreement with the FWS, this modeling project mapped known active leks across the West. This served as a standard starting point for all States to identify priority habitat for the species.

Error! Hyperlink reference not valid. In March 2010, the FWS published its *12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered* (75 FR 13910, March 23, 2010). In that finding, the FWS concluded that GRSG was "warranted, but precluded" under the Endangered Species Act (ESA). This finding indicates that, although the species meets the criteria for listing, immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

As part of its 2010 finding, the FWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. The FWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 FR 13910, March 23, 2010). In addition, the FWS found that existing local, State, and Federal regulatory mechanisms were not sufficient to address threats to the habitat. The FWS has identified for the BLM its resource management plans (RMPs) as the primary regulatory mechanisms; the BLM manages approximately 66 million acres of the remaining habitat for the species (see **Figure 1-4**, GRSG Priority Areas for Conservation, Populations, and WAFWA Management Zones).

1.3 THREATS TO GRSG IN THE GREAT BASIN REGION

In its 2010 finding, the FWS identified a number of specific threats to GRSG in the Great Basin Region. The primary threats are the widespread present and potential impacts of wildfire, the loss of native habitat to invasive species, and conifer encroachment. Other threats, some of which are more localized, are habitat fragmentation due to human disturbances associated with energy development, mining, infrastructure, recreation, urbanization, and sagebrush elimination, as well as impacts on habitat associated with free-roaming equids (horses and burros) and improper livestock grazing.

In 2011, the BLM established the GRSG National Technical Team (NTT), comprised of BLM, USGS, NRCS, and State specialists. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) to promote sustainable GRSG populations focused on the threats identified in the FWS listing determination (75 *Federal Register* [FR] 13910) in each of the regional WAFWA Sage-Grouse MZs (**Figure 1-4**). The NTT produced *A Report on National Greater Sage-grouse Conservation Measures* (NTT Report; NTT 2011) in which it proposed conservation measures based on habitat requirements and other life history requirements for GRSG. The NTT Report described the scientific basis for the conservation measures proposed within each program area. It also emphasized the importance of standardizing monitoring across the WAFWA GRSG MZs.

In 2012, the FWS, with the support of the Western Governors Association Sage-Grouse Task Force, convened the Conservation Objectives Team (COT), composed of State and Federal representatives. One of the team's tasks was to produce a peer-reviewed report identifying the principal threats to

GRSG survival. Another task was to determine the degree to which these threats need to be reduced or lessened to conserve the GRSG so it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The COT Report, released in March 2013, also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs . . . is the essential foundation for sage-grouse conservation" (FWS 2013). Finally, the COT Report identified present and widespread, as well as localized threats by GRSG population across the West (**Table 1-2**). The BLM also identified and explained additional threats in the Final EISs that were published with proposed plans on May 29, 2015. **Figure 1-4** identifies the PACs, GRSG populations (and their names), and WAFWA MZs across the West.

A summary of the nature and extent of threats identified in the COT Report for each remaining identified population of GRSG in the Great Basin Region—as highlighted in the 2013 COT Report—is provided in **Table 1-2**.

1.4 NATIONAL GREATER SAGE GROUSE CONSERVATION STRATEGY

The BLM recognized the need to incorporate explicit objectives and concrete conservation measures into RMPs[1] to conserve GRSG habitat and provide robust regulatory mechanisms. This was based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a decision on whether to propose this species for listing, In August 2011, the BLM charted a plan to revise and amend existing RMPs throughout the range of the GRSG. The intent was to incorporate management actions to conserve, enhance, and restore the species and the habitat on which it depends. Separate planning began that would address the conservation needs of the Bi-State populations in California and Nevada and the Washington State distinct population segment.

The BLM found that additional management direction and specific conservation measures on Federal public lands would be necessary to address the present and anticipated threats to GRSG habitat and to restore habitat where possible. This finding was in light of the 2010 "warranted" determination by the FWS, the recommendations of the NTT, and specific threats summarized in the COT Report. The BLM proposed to incorporate the management direction and conservation measures into its land use plans. The goals of incorporating these specific measures into BLM land use plans are to conserve, enhance, and restore GRSG and its habitat and to provide sufficient regulatory certainty such that the need for listing the species under the ESA may be avoided.

In December 2011, the BLM published a Notice of Intent to prepare EISs and a Supplemental EIS to incorporate GRSG conservation measures into land use plans across the range of the species.

The planning associated with the National GRSG Conservation Strategy has been coordinated under two administrative planning regions: the Rocky Mountain Region and the Great Basin Region. The regions were drawn roughly to correspond with the threats identified by the FWS in its 2010 listing decision, along with the WAFWA MZs framework (Stiver et al. 2006). Due to differences in the

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[1] BLM land use plans prepared under the present regulations (see 43 CFR 1601.0-5[n]) are generally known as resource management plans. Some BLM land use plans, including ones predating the present regulations, are referred to by different names, including management framework plans. For purposes of this ROD, the BLM and Forest Service land use plan and resource management plan interchangeably refer to all BLM-administered land use plans.

Figure 1-4

Greater Sage-Grouse Priority Areas for Conservation, Populations, and WAFWA Management Zones

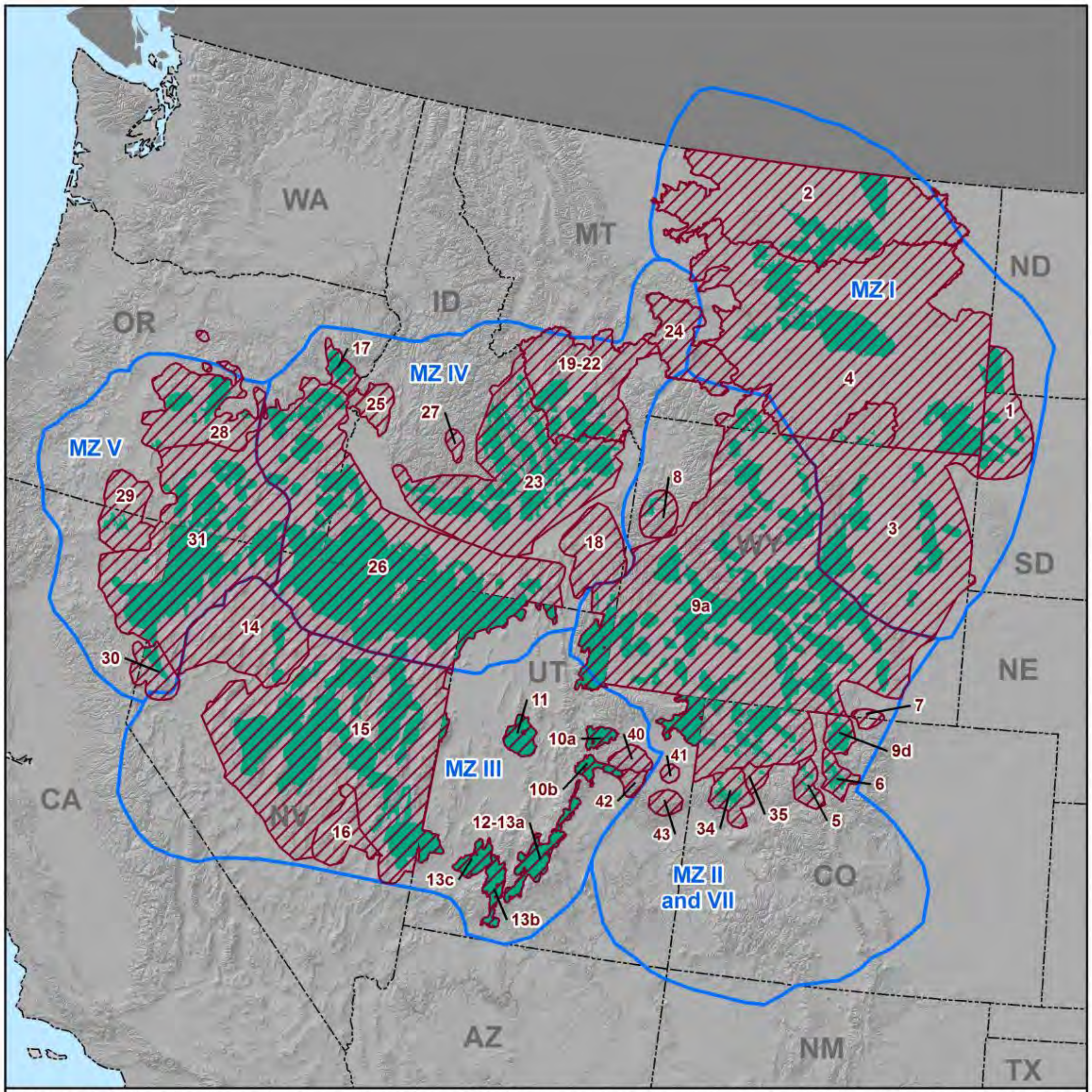

Figure 1-4: Greater Sage-Grouse Priority Areas for Conservation, Populations and WAFWA Management Zones

Legend

- WAFWA Sage-grouse Management Zones
- 🟩 Greater Sage-grouse Priority Areas for Conservation (PAC)
- ▨ WAFWA Revised Sage-Grouse Populations 2015

Miles
0 50 100

September 2015

1	Dakotas
2	Northern Montana
3	Powder River Basin
4	Yellowstone Watershed
5	Eagle/S Routt CO
6	Middle Park CO
7	Laramie WY
8	Jackson Hole WY
9a	Wyoming Basin
9d	North Park
10a	Strawberry Valley
10b	Carbon
11	Sheeprock Mountains
12-13a	Parker Mountain-Emery
13b	Panguitch
13c	Bald Hills
14	NW-Interior NV
15	Southern Great Basin
16	Quinn Canyon Range NV
17	Baker OR
18	E-Central ID
19-22	SW Montana
23	Snake, Salmon, & Beaverhead
24	Belt Mountains MT
25	Weiser ID
26	Northern Great Basin
27	Sawtooth ID
28	Central OR
29	Klamath OR/CA
30	Warm Springs Valley NV
31	Western Great Basin
34	Parachute Piceance Roan
35	Meeker - White River
40	Anthro Mountain
41	S White River
42	W Tavaputs
43	E Tavaputs Plateau

Table 1-2
Threats to GRSG in the Great Basin Region as identified by the COT

Population	Unit Number	Isolated Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifers	Weeds/Annual Grasses	Energy	Mining	Infrastructure	Improper Grazing	Free-Roaming Equids	Recreation	Urbanization	EIS/Plan
Rich-Morgan-Summit (Utah)	9b				Y	Y	Y	Y		Y			Y	Y	Utah
Uintah (Utah)	9c				Y	Y	Y	L	Y	Y			Y	Y	Utah
Strawberry Valley (Utah)	10a	Y			Y	Y	Y	Y		Y			Y		Utah
Carbon (Utah)	10b	Y			Y		Y	Y	Y	Y			Y		Utah
Sheeprock Mountains (Utah)	11	Y			Y	L	L	Y	Y	L		Y	L		Utah
Emery (Utah)	12	Y			Y	Y	Y	Y	Y	Y			Y		Utah
Greater Parker Mountain (Utah)	13a				Y	Y	Y			Y			Y		Utah
Panguitch (Utah)	13b			Y	Y	Y	Y	Y	L	Y			Y	L	Utah
Bald Hills (Utah)	13c	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Utah
Ibapah (Utah)	15a	Y			Y	Y	Y	Y	Y	Y		Y	Y		Utah
Hamlin Valley (Utah)	15b	Y			Y	Y	Y			Y		Y	Y		Utah
Box Elder (Utah)	26b			Y	Y	Y	Y	L	Y	Y			Y		Utah
N. Great Basin (Oregon, Idaho, Nevada)	26a		L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	Idaho/SW Montana, Oregon, Nevada/California
Baker (Oregon)	17	Y	Y	Y	Y	L	Y	L	Y	L	U		L	L	Oregon
Central Oregon (Oregon)	28		L	L	Y	Y	Y	L	Y	L	Y	U	L	L	Oregon
W. Great Basin (Oregon, California, Nevada)	31		L	L	Y	Y	Y	L	L	L	Y	Y	U		Oregon, Nevada/California
Klamath (California)	29	Y	U	U	Y	Y	Y	L		U	U	U	U	U	Nevada/California
Northwest Interior (Nevada)	14	Y			Y		Y	U	Y	Y	Y	Y	Y		Nevada/California
Southern Great Basin (Nevada)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y		Nevada/California
Quinn Canyon Range (Nevada)	16	Y			Y	Y	Y			Y	Y	Y	Y		Nevada/California
Warm Springs Valley (Nevada)	30	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Nevada/California

Table 1-2
Threats to GRSG in the Great Basin Region as identified by the COT

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Improper Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan**
East Central (Idaho)	18	**Y**	L	**Y**	L	**Y**	L	**Y**		**Y**	**Y**		L		Idaho/SW Montana
Snake-Salmon-Beaverhead (Idaho)	23		L	L	**Y**	L	**Y**	**Y**		L	**Y**	**Y**	L		Idaho/SW Montana
Weiser (Idaho)	25	**Y**	L	L	L	L	**Y**	**Y**		L	**Y**		L	L	Idaho/SW Montana
Sawtooth (Idaho)	27	**Y**	L		L	U	L			**Y**	**Y**		L		Idaho/SW Montana
Southwest Montana (Montana)	19-22		L		L	L	**Y**	L	L	L	**Y**		L	L	Idaho/SW Montana

Source: FWS 2013
Threats are characterized as Y = threat is present and widespread, L = threat present but localized, and U = unknown.

ecological characteristics of sagebrush across the range of the GRSG, WAFWA delineated seven MZs (MZs I to VII) based primarily on floristic provinces. Vegetation found within an MZ is similar, and GRSG and their habitats within these areas are likely to respond similarly to environmental factors and management actions.

The Rocky Mountain Region is composed of BLM planning efforts, including plan revisions and plan amendments, in Montana, North Dakota, South Dakota, Wyoming, Colorado, and portions of Utah. This region falls within WAFWA MZs I (Great Plains), II (Wyoming Basin) and a portion of VII (Colorado Plateau). The Great Basin Region is composed of planning efforts (plan amendments) in California, Nevada, Oregon, Idaho, and portions of Utah and Montana. That region falls within WAFWA MZs III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin).

Both the Rocky Mountain and Great Basin regions are further divided into sub-regions. The BLM began sub-regional planning efforts and associated EISs to analyze the alternatives developed for each of the Draft and Final RMPAs and ARMPs across the range of the species.[2] These sub-regions are based on the identified threats to GRSG and the WAFWA MZs from the FWS 2010 listing decision, with additional detail on threats to individual populations and sub-regions from the FWS COT Report.

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[2] The National GRSG Conservation Strategy consisted of 15 separate EISs. For ease of implementation, the Bighorn Basin RMP has been split between the two field offices that make up the Bighorn Basin Planning Area, the Cody Field Office ARMP and the Worland Field Office ARMP. The Billings and Pompeys Pillar National Monument RMP has also been split between the Billings Field Office ARMP and Pompeys Pillar National Monument ARMP. This results in a total of 17 ARMPs and ARMPAs.

In the Rocky Mountain Region, some sub-regions correspond to BLM field and district office boundaries, specifically for planning that incorporates GRSG conservation measures through plan revisions that were that began before the start of the National GRSG Conservation Strategy in December 2011. **Figure 1-5** illustrates the regional and sub-regional Planning Area boundaries across the western United States.

The BLM used the best available science, including additional review and analysis from the USGS on specific issues that arose in developing the ARMPAs. Additionally, the BLM considered State GRSG conservation strategies where they existed, as well as State recommendations for measures to conserve GRSG on BLM-administered lands, where relevant, in its planning. These are reflected in the approved plans to the extent compatible with GRSG objectives to conserve, enhance, and restore GRSG habitat to address the threats identified in the FWS 2010 listing determination and the 2013 COT Report.

1.5 HOW THE ARMPAS ADDRESS THE IDENTIFIED THREATS TO THE CONSERVATION OF GRSG

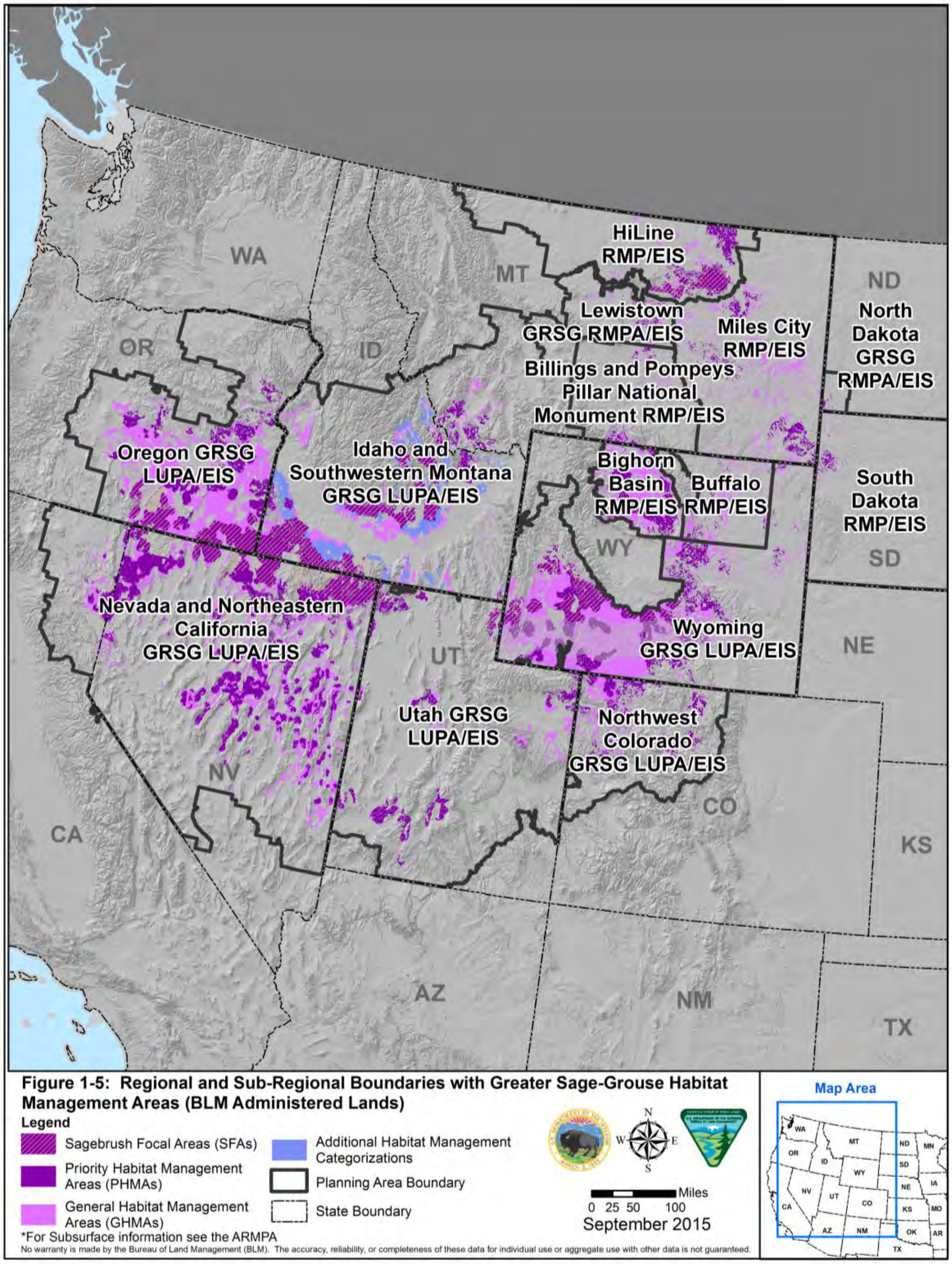
The 2006 WAFWA *Greater Sage-Grouse Comprehensive Conservation Strategy* stated goal for managing GRSG was to "maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations" (Stiver et al. 2006). The NTT Report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed" (NTT 2011).

In establishing the COT Report, with the backing of the Sage Grouse Task Force, the FWS Director affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006 WAFWA report—reversing negative population trends and achieving a neutral or positive population trend—and emphasized the following:

> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels. (Stiver et al. 2006)"

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT Report stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation" (FWS 2013). To achieve this, the COT Report recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal" (FWS 2013). The COT Report emphasized an "avoidance first strategy" and stressed those threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy" (FWS 2013).

Figure 1-5
Regional and Sub-Regional Boundaries with PHMAs and GRSG Habitat Management Areas (BLM-Administered Lands)



The plans were developed to address specific, identified threats to the species in order to conserve GRSG such that the need to list the species under ESA may be avoided. Across ten western states, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain land use plan direction on approximately 66 million acres of the remaining habitat for the species (see **Figure 1-5**). These plans are the product of extensive coordination between the BLM and the Forest Service and the active engagement of the FWS which informed the BLM and Forest Service land allocation and related management decisions. The plans also benefit from strong collaboration with the States and reflect the unique landscapes, habitats, priorities and approaches in each.

In order to protect the most important GRSG habitat areas, planning began with mapping areas of important habitat across the GRSG's range. In collaboration with State fish and wildlife agencies, the BLM identified areas as preliminary priority habitat (PPH) and preliminary general habitat (PGH). In Utah, all occupied GRSG habitat was identified as PPH. The draft land use plans used PPH and PGH to analyze the impacts of the decisions the BLM was proposing in the plans. PPH and PGH were identified as Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas (GHMAs) in the Proposed RMPAs/Final EISs to identify the management decisions that apply to those areas (except for Nevada and Utah).

The designated GRSG Habitat Management Areas on BLM-administered lands in the decision area are PHMAs, which largely coincide with PACs identified in the COT Report;[3] GHMAs; Other Habitat Management Areas (OHMAs, applicable only to the Nevada and Northeastern California); and Important Habitat Management Areas (IHMAs, applicable only to Idaho). **Table 1-3** identifies surface acres of PHMAs, GHMAs, OHMAs, and IHMAs in the decision area for the Great Basin Region.

Habitat maps were based initially on State key habitat maps, which identified areas necessary for GRSG conservation. These areas were derived from breeding bird density maps and lek counts, nesting areas, sightings, and habitat distribution data. These data included occupied suitable seasonal habitats, nesting and brood-rearing areas, and connectivity areas or corridors. The BLM used this information to develop PPH and PGH maps and, subsequently, to identify PHMAs and GHMAs, respectively.

The COT Report preparers also used State key habitat maps as a basis for identifying PACs. The COT Report notes that there is substantial overlap between PACs and BLM PPH areas, with the exception of areas in Nevada and Utah (FWS 2013, p. 13). **Figure 1-5** illustrates the regional and sub-regional Planning Area boundaries, along with BLM-administered PHMAs and GHMAs across the western United States.

The BLM-administered surface and Federal mineral estate of each designation (in acres) in the Decision Area for the Great Basin Region are shown in **Table 1-3**; PHMAs, GHMAs, OHMAs, and IHMAs are defined below.

- **PHMA**—BLM-administered land identified as having the highest habitat value for maintaining sustainable GRSG populations. The boundaries and management strategies for PHMAs are derived from and generally follow the PPH boundaries. Areas of PHMAs largely

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[3] Except for PACs in Nevada and Utah, as specified on page 13 of the COT Report; see **Figure 1-4**

coincide with areas identified as PACs in the COT Report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report).

Table 1-3
Surface Acres of PHMAs, GHMAs, OHMAs, and IHMAs in the Decision Area for the Great Basin Region

BLM-Administered Surface Acres	PHMAs	GHMAs	OHMAs	IHMAs
Idaho and Southwestern Montana	4,627,200	2,179,700	0	2,737,600
Utah*	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern California	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

*41,200 acres of National Forest System lands in the Anthro Mountain area of Utah would be managed as neither PHMAs nor GHMAs. These areas would be identified as "Occupied – Anthro Mountain." In the Utah ARMPA, these areas are considered split-estate, where the BLM administers the mineral estate.

- **GHMA**—BLM-administered GRSG habitat that is occupied seasonally or year-round and is outside of PHMAs. It is where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMAs are derived from and generally follow the PGH boundaries.
- **OHMA**—BLM-administered land in Nevada and Northeastern California, identified as unmapped habitat in the Proposed RMP/Final EIS, that is within the Planning Area and contains seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.
- **IHMA**—BLM-administered land in Idaho that provides a management buffer for and that connect patches of PHMAs. IHMAs encompass areas of generally moderate to high habitat value habitat or populations but that are not as important as PHMAs. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

The ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape; they are a subset of PHMAs (see **Figure 1-3**). Across the Great Basin Region, there are 8,385,280 acres of BLM-administered SFAs. They correspond to the areas identified by the FWS as GRSG strongholds and represent "a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection" (FWS 2014a).

SFAs are areas of highest habitat value for GRSG and are managed to avoid new surface disturbance for the following reasons:

- They contain high-quality sagebrush habitat and the highest breeding bird densities
- They have been identified as essential to conservation and persistence of the species
- They represent a preponderance of current Federal ownership
- In some cases, they are next to protected areas that serve to anchor the conservation importance of the landscape

SFA management is consistent with the recommendations provided by the FWS that these are the areas "where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species" (FWS 2014a).

Remaining habitats in GHMAs and IHMAs (applicable only to BLM-administered lands in Idaho) would be managed consistent with the COT Report recommendation to recognize "that important habitats outside of PACs be conserved to the extent possible" (FWS 2013). Thus, land allocations in GHMAs and IHMAs provide for more flexibility for land use activities, while minimizing impacts on existing GRSG leks.

Major components of the attached ARMPAs that address the specific threats to GRSG and its habitat, as identified in the FWS 2010 listing decision and 2013 COT Report (many of which were also identified by the BLM's 2011 NTT Report), are listed and summarized in **Table 1-4**.

This tiered habitat management area framework, associated with the land use plan allocation decisions in the ARMPs and ARMPAs (explained more fully in **Section 1.6.2** of this ROD) provides a high degree of certainty that the integrity of PHMAs can be maintained through management decisions. This would be done to avoid or minimize additional surface disturbance. At the same time, it would recognize the potential importance of areas outside of PHMAs for maintaining connectivity between highly important habitats and their potential for addressing seasonal habitat needs, such as winter habitat areas not fully incorporated in PHMAs.[4]

Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

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[4] An analysis by Crist et al. (2015) highlights the importance of certain key "priority areas" across the species' range and the importance of connectivity between priority areas as a component of successful GRSG conservation. Generally, these priority areas coincide with PHMAs across the landscape. It is important to note that BLM-administered SFAs also coincide with a number of the areas identified by Crist et al. (2015) as important for maintaining connectivity between the network of conservation areas, essential PHMAs, that are of greatest importance to the integrity of the conservation strategy. In addition, to maintain connectivity between PHMAs across the remaining range, requirements were incorporated into most of the ARMPAs for the application of lek buffers. This is consistent with guidance provided by the USGS, mitigation to a net conservation gain, and the use of required design features for projects in GHMAs, described later in this document. These measures are specifically intended to provide benefits for GRSG in GHMAs that can provide added connectivity and habitat protection consistent with the Crist et al. (2015) findings.

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner.
All development threats, including mining, infrastructure, and energy development	• PHMAs—Implement a human disturbance cap of 3 percent within the biologically significant unit (BSU) and proposed project analysis areas in PHMAs (slight variations to this management component in Nevada only). • PHMAs and IHMAs—Apply a disturbance density cap of 1 energy and mining facility per 640 acres (except in Nevada). • IHMAs—Implement the 3 percent disturbance cap. Apply Anthropogenic Disturbance Development Criteria (applicable to Idaho only). • Apply buffers based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply required design features (RDFs) when authorizing actions in GRSG habitat. • Minimize the effects of infrastructure projects, including siting, using the best available science, updated as monitoring information on current infrastructure projects becomes available. • Consider the potential for the development of valid existing rights when authorizing new projects in PHMAs. • When authorizing third-party actions that result in habitat loss and degradation, require and ensure mitigation that provides a net conservation gain to the species.
Energy development—fluid minerals, including geothermal resources	• PHMAs—Open to fluid mineral leasing subject to a no surface occupancy (NSO) stipulation without waiver or modification and with limited exceptions. In SFAs, an NSO stipulation would be applied without waiver, modification, or exception. In Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for authorization if certain criteria are met. • IHMAs—Open to fluid mineral leasing, subject to NSO stipulation without waiver or modification and with limited exception (applicable to Idaho only). • GHMAs—Open to fluid mineral leasing, subject to controlled surface use and timing limitation lease stipulations (except in Utah, where some portions of GHMAs are open with standard lease stipulations). • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
Energy development—wind energy	• PHMAs—Exclusion area (not available for wind energy development under any conditions, except in the southeastern counties of Oregon, where portions of PHMAs are avoidance areas). • IHMAs—Avoidance area (may be available for wind energy development with special stipulations; applicable to Idaho only). • GHMAs—Avoidance area (may be available for wind energy development with special stipulations, except in Utah and Idaho, where these areas are

Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
	open to wind energy development).
Energy development—solar energy	• PHMAs—Exclusion area (not available for solar energy development under any conditions, except in southeastern counties in Oregon, where portions of PHMAs are avoidance areas). • IHMAs—Avoidance area (may be available for solar energy development with special stipulations; applicable to Idaho only). • GHMAs—Exclusion area (not available for solar energy development under any conditions, except in Oregon and Montana, where these areas are avoidance areas for solar energy development, and Idaho, where these areas are open to solar energy development).
Infrastructure—major rights-of-way (ROWs)	• PHMAs—Avoidance area (may be available for major ROWs with special stipulations). • IHMAs—Avoidance area (may be available for major ROWs with special stipulations; applicable to Idaho only). • GHMAs—Avoidance area (may be available for major ROWs with special stipulations, except in Utah, where GHMAs is open).
Infrastructure—minor ROWs	• PHMAs—Avoidance area (may be available for minor ROWs with special stipulations). • IHMAs—Avoidance area (may be available for minor ROWs with special stipulations; applicable to Idaho only).
Mining—locatable minerals	• SFAs—Recommend withdrawal from the Mining Law of 1872.
Mining—nonenergy leasable minerals	• PHMAs—Closed area (not available for nonenergy leasable minerals; however, expansion of existing operations could be considered if the disturbance is within the cap and subject to compensatory mitigation).
Mining—salable minerals	• PHMAs—Closed area (not available for salable minerals), with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met).
Improper livestock grazing	• Prioritize the review and processing of grazing permits and leases in SFAs, followed by PHMAs. • Ensure that the NEPA analysis for renewals and modifications of grazing permits and leases includes specific management thresholds, based on the GRSG habitat objectives table, land health standards, and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs, followed by PHMAs, to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid (horses and burros) management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage herd management areas in GRSG habitat within established appropriate management level (AML) ranges to achieve and maintain GRSG habitat objectives.

Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
	• Prioritize rangeland health assessment, gathers, and population growth suppression techniques, monitoring, and review and adjust AMLs and preparation of herd management area plans in GRSG habitat.
Range management structures	• Allow range improvements that do not impact GRSG or that provide a conservation benefit to GRSG, such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas.
Recreation	• PHMAs and IHMAs—Do not construct new recreation facilities unless required for health and safety purposes or if the construction will result in a net conservation gain to the species. • Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. • PHMAs and GHMAs—Off-highway vehicle (OHV) use limited to existing routes (routes to be designated through future travel management planning). The Utah ARMPA does retain two areas as open to OHV use in PHMAs.
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Restrict the use of prescribed fire for fuel treatments. • Prioritize post-fire treatments in SFAs, other PHMAs, IHMAs, and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMAs, IHMAs, and GHMAs that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMAs—Maintain all lands capable of producing sagebrush (but no less than 70 percent), with a minimum of 15 percent sagebrush canopy cover, consistent with specific ecological site conditions. • Ensure that all BLM use authorizations contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat, in a manner that considers tribal cultural values.
Agricultural conversion and exurban development	• Retain GRSG habitat in Federal management, unless disposal (including exchanges) of the lands would provide a net conservation gain to GRSG or disposal (including exchanges) of the lands would have no direct or indirect adverse impact on conservation of GRSG.

1.6 KEY COMPONENTS OF THE BLM GRSG CONSERVATION STRATEGY

The ARMPAs were developed to meet the purpose and need to conserve, enhance, and restore GRSG and their habitat by eliminating or minimizing threats to GRSG habitat identified in the 2010 listing decision and highlighted in the Background and Purpose Section of the COT Report (FWS 2013). Consequently, consistent with guidance contained in the COT and NTT Reports, the BLM identified the following essential components of the GRSG conservation strategy:

- Avoiding or minimizing new and additional surface disturbances
- Improving habitat conditions
- Reducing threats of rangeland fire to GRSG and sagebrush habitat in the Great Basin
- Monitoring and evaluating the effectiveness of conservation measures and implementing adaptive management as needed

The land allocations and management actions included in the ARMPAs incorporate these components and are summarized below.

1.6.1 Avoid and Minimize Surface Disturbance

Land Use Allocations and Management Actions in SFAs, PHMAs, and GHMAs

The four Great Basin ARMPAs build on the designated habitat management areas described in **Section 1.5** by applying management actions to these areas to avoid and minimize disturbance associated with proposed projects, as described below and shown in **Table 1-4**. Land use plan allocations specify locations within the Planning Area that are available or unavailable for certain uses and also prioritize conservation and restoration management actions applied to habitat management areas.

The COT Report states that “maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation” (FWS 2013, p. 36). Areas of PHMAs largely coincide with areas identified as PACs in the COT Report. While surface disturbance associated with development in the Great Basin is not as significant a threat to GRSG and its habitat as rangeland fire and invasive species, the BLM ARMPAs include land allocations and management actions that avoid and minimize surface disturbance in PHMAs for identified threats (e.g., energy, mining, infrastructure, improper grazing, free-roaming horses and burros, recreation and urbanization). These land allocations and management actions are necessary because the location and extent of habitat loss to fire is difficult to predict, and much of the habitat, due to low precipitation in the Great Basin, is difficult to restore once lost. Further, even a small amount of development in the wrong place could have an outsized impact in these landscapes.

SFAs—The most restrictive allocations include requirements to avoid and minimize additional disturbance in SFAs, which are a subset of lands within PHMAs, with the highest habitat value for GRSG. Surface disturbance from fluid mineral development is avoided by imposing NSOs, without waiver, modification, or exception. In addition, these areas will be recommended for withdrawal to address the risk of disturbance due to mining.

PHMAs—In PHMAs outside of SFAs new fluid mineral leasing would be subject to NSOs, with no waivers or modifications. Exceptions would be granted only under two circumstances: if the proposed action would not have direct, indirect, or cumulative effects on GRSG or its habitat or if the action is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and it would provide a clear conservation gain to GRSG. This is fully consistent with guidance in the NTT Report, which states, "Do not allow new surface occupancy on federal lands within priority habitats" (NTT 2011, p. 23).

Similarly, PHMAs are closed to nonenergy and salable mineral development (this does not apply to locatable minerals governed under the 1872 Mining Law). An exception may be granted for free-use permits and the expansion of active pits for salable minerals and expansion of nonenergy leasable development under certain conditions. This exception is included because of the importance of these materials to local communities and their limited disturbance, which would be offset by the mitigation requirements.

Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses the potential disturbance threat from coal development. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is deemed unsuitable for all or certain coal mining methods, pursuant to 43 CFR 3461.5. PHMAs are essential habitat for maintaining GRSG for the purposes of suitability criteria set forth at 43 CFR 3461.5(o)(1).

All PHMAs will be managed as exclusion areas for commercial renewable energy development (solar and wind), with the exception of areas outside of SFAs in three counties in southeastern Oregon. The three counties in Oregon will be managed as avoidance areas, with priority placed on locating commercial-scale wind and solar energy development in nonhabitat areas first, that is, outside of PHMAs and GHMAs, before development in PHMAs is approved. New ROWs and development for transmission lines, pipelines, and related infrastructure would be avoided by restricting land use authorizations. In avoidance areas, exceptions would be granted only if it can be demonstrated that adverse impacts would be avoided or that residual impacts would be mitigated.

High voltage transmission lines will be avoided in PHMAs. A limited number of priority transmission lines (Transwest Express and portions that are collocated with Transwest Express) of Gateway South, Gateway West, and Boardman to Hemingway have been proposed to expand access to renewable sources of energy and to improve the reliability of the western grid. These projects have been underway for several years, and are currently being analyzed under separate authorization processes. As part of the decision-making process for those projects, conservation measures for GRSG are being analyzed in the project-specific NEPA processes, which should achieve a net conservation benefit for GRSG.

New recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat or unless required for health and safety purposes.

In PHMAs, travel is limited to existing routes until new routes are designated through the implementation travel management planning process. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning process.

A 3 percent human disturbance cap in PHMAs has been established in accordance with the recommendations contained in the NTT Report and peer-reviewed literature from the Great Basin (Knick 2013). Disturbance will be calculated at two scales: first at the BSU scale determined in coordination with the state and second for the proposed project area. BSUs are geographic units of PHMAs that contain relevant and important GRSG habitat. In Oregon, for example, BSUs are synonymous with PACs. These BSUs are used solely for the calculation of human disturbance caps and in some ARMPAs, the adaptive management habitat triggers.

If the 3 percent human disturbance cap is exceeded on lands (regardless of landownership) in PHMAs in any given BSU, no further discrete human disturbances (subject to valid existing rights) will be permitted on BLM-managed lands in that BSU until restoration of disturbed lands brings the BSU below the cap. If the 3 percent human disturbance cap is exceeded on all lands (regardless of landownership) within a proposed project analysis area in a PHMAs, then the BLM would permit no further human disturbance until disturbance in the area has been reduced to below the cap.

An exception to the 3 percent disturbance cap is provided in designated utility corridors for achieving a net conservation gain to the species. This exception is limited to projects that fulfill the use that the corridors were designated for (e.g., transmission lines and pipelines) and within the designated width of a corridor. This exception will concentrate future ROW surface disturbance in areas of existing disturbance and will avoid new development of infrastructure corridors in PHMAs, which is consistent with guidance in the COT Report. In addition, the Oregon and Nevada/Northeast California ARMPAs include variations to the disturbance cap. Oregon does not allow more than 1 percent new human disturbance per decade, not to exceed 3 percent disturbance at any time. In Nevada, the 3 percent disturbance cap can be exceeded at the BSU or project level provided that the outcome results in a net conservation benefit to the species with the concurrence of the BLM, the Nevada Department of Wildlife, and the FWS in each exception.

In the its Dillon Field Office in southwest Montana, the BLM will limit disturbance to 3 percent until the State institutes its Sage Grouse Plan's disturbance calculation method, at which time disturbance will be permitted up to a 5 percent cap. As with the Wyoming Core Area Strategy, this is to recognize the importance of the all-lands/all-disturbances strategy that Montana will institute for GRSG conservation (Montana Office of the Governor Executive Order No. 10-2014; State of Montana 2014). Appendix E of each of the attached ARMPAs includes additional information about the method for calculating human disturbance at the BSU and project scales.

The ARMPAs also incorporate a cap on the density of energy and mining facilities to encourage collocating structures to reduce habitat fragmentation in PHMAs. The limit is an average of one facility per 640 acres in PHMAs in a project authorization area. This is consistent with guidance contained in the NTT Report. If the disturbance density in the PHMAs in a proposed project area is, on average, less than 1 facility per 640 acres, the project can proceed through the NEPA analysis, incorporating mitigation measures into an alternative. If the disturbance density in the proposed project area is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or redesigned so facilities are collocated into an existing disturbed area, subject to applicable laws and regulations, such as the 1872 Mining Law and valid existing rights. The 1 facility per 640 density decision does not apply to Nevada, as described in **Section 1.7**.

GHMAs—While restrictions on future development in PHMAs are intended to avoid or minimize additional surface disturbance, restrictions on development in GHMAs are intended to allow disturbance but minimize any adverse effects of disturbance with restrictions on development activities to ensure compatibility with GRSG habitat needs. In addition, mitigation to avoid, minimize, and compensate for unavoidable impacts will be required for proposed projects in GHMAs, as will the application of the RDFs discussed below.

Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation. (see **Table 1-4** for more details on GHMAs management decisions.) Any disturbance is subject to mitigation, with the objective of first avoiding and minimizing potential impacts on GRSG or its habitat and then compensating for unavoidable impacts on GRSG or its habitat, to a net conservation gain standard for the species. This is consistent with guidance in the COT Report which states: "Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur… If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal, state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs" (FWS 2013).

These conservation measures are intended to ensure that areas of GHMAs that can provide connectivity between PHMAs may be important seasonal habitats not identified or incorporated into previously mapped areas of PHMAs or that they can provide important habitat to replace areas of important habitat lost to fire or human disturbance. This strategy is particularly important given the recent USGS report by Crist et al. (2015), *Range-Wide Network of Priority Aras for Grater Sage-Grouse—A Design for Conserving Connected Distributions or Isolating Individual Zoos*? For management decisions and allocations associated with IHMAs in Idaho, see **Table 1-4**.

Habitat Protection and Surface Disturbance Measures in PHMAs and GHMAs

The measures below are related to habitat protection and surface disturbance. They will be applied in both PHMAs and GHMAs.

Prioritization Objective—In addition to allocations that limit disturbance in PHMAs and GHMAs, the ARMPAs prioritize oil and gas leasing and development outside of identified PHMAs and GHMAs to further limit future surface disturbance and to encourage new development in areas that would not conflict with GRSG. This objective is intended to guide development to lower conflict areas and, as such, to reduce the time and cost associated with oil and gas leasing development. It would do this by avoiding sensitive areas, reducing the complexity of environmental review and analysis of potential impacts on sensitive species, and decreasing the need for compensatory mitigation.

Grazing—While improper livestock grazing can be a threat to GRSG habitat, grazing is not considered a discrete surface-disturbing activity for monitoring and calculating disturbance. The plans address grazing management to conserve GRSG and its habitat and is further described in **Section 1.6.2**.

Lek Buffers—In addition to any other relevant information determined to be appropriate, the BLM will further assess and address impacts from certain activities using the lek buffer distances, as identified in the USGS report, *Conservation Buffer Distance Estimates for GRSG – A Review* (Manier et al. 2014). Lek buffer distances will be applied at the project-specific level as required conservation measures to address the impacts on leks identified in the NEPA analysis. The lek buffer distances vary by type of disturbance, such as road, energy development, and infrastructure; justifiable departures may be appropriate, as fully described in Appendix B of the ARMPAs. In both PHMAs and GHMAs, impacts should be avoided first by locating the action outside of the applicable lek buffer-distances, as defined in the ARMPAs. In PHMAs, the BLM will ensure that any impacts within the buffer distance from a lek are fully addressed. In GHMAs, the BLM will minimize and compensate for any unavoidable impacts to the extent possible. This approach to determining relevant lek buffer distances is consistent with the COT Report recommendation that "conservation plans should be based on the best available science and use local data on threats and ecological conditions" (FWS 2013).

Required Design Features—RDFs are used for certain activities in all GRSG habitat, including oil and gas development, infrastructure, and other surface-disturbing activities and are fully described in Appendix C of the attached ARMPAs. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts on GRSG and its habitat from threats, such as those posed by standing water that can facilitate West Nile virus or tall structures that can serve as perches for predators. The applicability and overall effectiveness of each RDF, however, cannot be fully assessed until the BLM knows the project level, project location, and design. Because of site-specific circumstances, some RDFs may not apply to some projects, such as when a resource is not present on a given site) or may require slight variations, such as a larger or smaller protective area. In Nevada and Northeastern California, RDFs are also applied to identified OHMAs.

In summary, all forms of new development in PHMAs and GHMAs would either be closed, excluded, avoided, or developed only if the resultant effect were a net conservation gain to the GRSG or its habitat, ensuring that existing habitat would be protected and providing opportunities through compensatory mitigation.

1.6.2 Improving Habitat Condition

In addition to prescribing land use allocations and managing resource uses to minimize and avoid further surface disturbance, the ARMPAs identify management actions to restore and improve GRSG habitat.

Habitat Management—The ARMPAs contain an overall habitat management objective that "[i]n all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush canopy cover, consistent with specific ecological site conditions." To move toward this goal, the ARMPAs specify GRSG habitat objectives to be incorporated into land management programs, including wild horses and burros (WHBs), grazing, and habitat restoration. These habitat objectives were developed for each of the GRSG's life history stages within each ARMPA's sub-region. These objectives will be used to meet the applicable land health standard in GRSG habitats.

The ARMPAs also include specific decisions to improve habitat conditions and meet the habitat objectives by treating invasive annual grasses and removing encroaching conifers in SFAs, PHMAs, and GHMAs and by restoring degraded landscapes, including those impacted by fires (see **Section 1.6.3**.)

Livestock Grazing—The BLM recognizes that improper grazing can be a threat to GRSG and its habitat. Because grazing is the most widespread use of the sagebrush steppe ecosystem, the ARMPAs address improper grazing. The COT Report (FWS 2013) recommends conducting "grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the Great Basin ARMPAs require incorporating terms and conditions informed by GRSG habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritizing reviewing and processing authorizations and field checks of grazing permits, and taking numerous actions to avoid and minimize the impacts of range management structures (see **Table 1-4**).

The BLM will prioritize reviewing and processing grazing authorizations, as well as field checking grazing permits in the habitat that is most important to GRSG populations: first in SFAs, then PHMAs, followed by GHMAs, focusing first on riparian and wet meadows. The decision to prioritize in this way does not indicate that grazing is more of a threat or is an incompatible use in any given area; rather it reflects a decision to prioritize resources to ensure that permittees and the BLM manage grazing properly in those areas most important to GRSG. If the BLM were to find that relevant habitat objectives are not being met due to improper grazing, it would work with the permittee to ensure progress toward habitat objectives.

Wild Horses and Burros—To address the localized threat due to negative influences of grazing by free-roaming WHBs, the BLM will focus on maintaining WHB herd management areas in GRSG habitat in established AML ranges. This is to achieve and maintain GRSG habitat objectives. It includes completing rangeland health assessments, prioritizing gathers and population growth suppression techniques, and developing or amending herd management area plans to incorporate GRSG habitat objectives and management considerations. The BLM will prioritize WHB management first in SFAs, then the remainder of PHMAs, and then GHMAs. In SFAs and PHMAs, the BLM will assess and adjust AMLs through the NEPA process within herd management areas when WHBs are identified as a significant factor in not meeting land health standards, even if current AML is not being exceeded.

Mitigation and Net Conservation Benefit—During the implementation of the ARMPAs, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in GRSG habitat loss and degradation, the BLM will require mitigation that provides a net conservation gain (the actual benefit or gain above baseline conditions) to the species. This will include accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action.

This standard is consistent with the recommendation in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0* (FWS 2014b), which states that mitigation "should be strategically designed to result in net overall positive outcomes for sage-grouse." Mitigation will follow the regulations from the CEQ NEPA regulatory requirements (40 CFR 1508.20; e.g., avoid, minimize, and compensate). It would be implemented on BLM-administered lands in a manner consistent with Department of the Interior guidance for landscape mitigation, pursuant to Secretarial Order (S.O.) 3330. If impacts from BLM management actions and authorized third-party actions result in habitat loss and degradation that remain after avoidance and minimization measures are applied, then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.

To help achieve the mitigation goal of net conservation gain across the range, the BLM will establish GRSG Conservation Teams, based on WAFWA MZs and including representatives from the respective

States, the Forest Service, FWS, and NRCS. These Conservation Teams will facilitate cross-state issues, such as regional mitigation and adaptive management monitoring and response. They will convene and respond to issues at the appropriate scale and will use existing coordination and management structures to the extent possible.

Climate Change—With regard to the threat of climate change, the ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy: Final Report to the Secretary of the Interior* (US Department of the Interior 2015) will further these goals and objectives.

The Fire and Invasives Assessment Team (FIAT) assessments that informed the ARMPAs and supported the development of the Fire Strategy (US Department of the Interior 2015) were designed to identify landscapes of high resistance and resilience based on research by Chambers et al. (2014). Additionally, limiting or eliminating human surface disturbance, especially in the SFAs, would ensure the integrity of the PHMAs and would restore habitat through fuels management, post-fire restoration, and mitigation efforts. Connectivity and availability of sagebrush habitat would increase, thus contributing to increased climate resilience. The SFAs in particular were identified as key areas to conserve as the climate changes. The Oregon ARMPA commits to using climate change science concerning projected changes in species ranges and changes in site capability. This would be used to adjust expected and desired native species compositions as that information becomes available.

As identified by the FWS 2010 listing decision and the COT Report, climate change can impact efforts to conserve the GRSG and its habitat in a number of ways. While several ARMPAs acknowledge the potential impact of climate change on GRSG habitat and conservation, specific strategies to address the impacts of climate change are limited. The BLM and Forest Service, in coordination with the FWS, will continue to assess the potential impacts of climate change on GRSG and its habitat and will develop strategies to mitigate the anticipated effects on GRSG conservation efforts, as necessary and appropriate. Changes to management decisions will require a plan revision or amendment, as appropriate, recognizing the need to ensure that future management direction improves the resilience of habitat areas essential to the conservation of the species.

1.6.3 Reducing Threats of Rangeland Fire to GRSG and Sagebrush Habitat

The COT Report emphasized that "rangeland fire (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency" (FWS 2013). Recent USGS studies by Brooks et al. (2015) and Coates et al. (2015) reinforce the importance of a comprehensive management strategy to prevent and suppress rangeland fires in the western part of GRSG range and to aggressively restore habitat areas impacted by fire.

For this reason, the ARMPAs seek to improve efforts to strategically develop fuel breaks, in collaboration with GRSG biologists. This would be done to reduce potential habitat loss from rangeland fires, accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush, and fight the spread of cheatgrass and other invasive species that increase the frequency and intensity of rangeland fires. However, prescribed fire will not be used in sagebrush steppe. The exception would be if the NEPA analysis for the burn plan were to provide a clear rationale for why alternative techniques were not selected as a viable option. The analysis also would need to explain how GRSG habitat management goals and objectives would be met by its use and how the COT Report objectives would be met. It would require a risk assessment to address how potential threats to GRSG habitat would be minimized.

Recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers et al. 2014) provides the basis for improved targeting of fire management activities on BLM-administered lands. The BLM, the Forest Service, FWS, and other cooperating agencies agreed to incorporate this approach into the ARMPAs. This information is being used to identify and design projects to change vegetation composition and structure to modify potential fire behavior to improve fire suppression effectiveness and limit fire spread and intensity due to invasive grasses and conifer encroachment. The BLM *Greater Sage Grouse Invasive Annual Grasses and Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification. It was done to determine where conifer removal would benefit important sagebrush habitats.

Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species and to prioritize vegetation treatments for the purpose closest to occupied GRSG habitats and near occupied leks.

In addition to and complementing the fire management measures in the ARMPAs described in this ROD, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department**" (emphasis added; US Department of the Interior 2015).

Secretarial Order 3336 directed the development of the *Integrated Rangeland Fire Management Strategy* (Strategy) which places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes. It focused on priority GRSG habitat, including that identified by the FIAT for the Great Basin Region, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT Assessments provide a critical guidance to conserve, enhance, and restore GRSG habitat consistent with best available science and identify highly resistant and resilient landscapes to target fire management in these most important lands.

A key element of the Strategy is a commitment to address the invasion and expansion of cheatgrass, medusahead rye, and other invasive grasses through expanded efforts to treat impacted acres. Efforts are underway to increase the acreages to be treated with chemical and biological agents to stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion. In addition, recently adopted Department of the Interior guidance will allocate Emergency Stabilization and Burned Area Rehabilitation (ES&BAR) funds on a risk-based approach using historic acres burned to accelerate and expand the restoration of burned lands with native grasses and sagebrush seedlings. The BLM recently announced a Native Seed Strategy to accelerate and expand the production, storage, and allocation of seed for native vegetation and sagebrush. The strategy is to restore and rehabilitate burned areas and accelerate the improvement of the sagebrush ecosystem and habitat for GRSG.

Finally, by issuing a leaders' intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions about firefighting resource allocation in 2015. Additional resources have been allocated and will be targeted at the following:

- Fuel treatments, including invasive species control
- Suppression, by positioning firefighting resources and training additional Rangeland Fire Protection Associations, local volunteer firefighters, and veteran fire fighters
- Restoring habitat in these areas

Firefighting assets (aircraft, firefighters, and related equipment) were positioned in advance of the 2015 fire season to improve capacity and reduce acres of rangelands lost to fire by improving the success of the initial attack. In future years, BLM firefighting assets will be located near PHMAs to limit habitat losses from rangeland fire.

1.6.4 Monitoring, Evaluation, and Adaptive Management

The COT Report preparers noted that "a monitoring program is necessary to track the success of conservation plans and proactive conservation activities. Without this information, the actual benefit of conservation activities cannot be measured and there is no capacity to adapt if current management actions are determined to be ineffective" (FWS 2013). The NTT further notes that "Monitoring is necessary to provide an objective appraisal of the effects of potentially positive conservation actions, and to assess the relative negative effects of management actions to sage-grouse populations and their habitats" (NTT 2011).

A range-wide monitoring and evaluation framework will be established and implemented, as described in the Monitoring Framework (Appendix D of each attached ARMPA). This monitoring strategy has two parts, as follows:

- Implementation monitoring (i.e., are decisions being implemented in a timely manner? are actions taken consistent with the plan decisions?)
- Effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals?)

Through effectiveness monitoring, the BLM can determine how management decisions and actions implemented through the ARMPAs affect GRSG habitat. This would be to determine if the desired management objectives, such as avoiding and minimizing additional surface disturbance in PHMAs, have been achieved. Understanding the effectiveness and validating results of ARMPA management decisions is an essential part of the GRSG conservation strategy and provides the means for determining if desired outcomes are being achieved.

Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, and size of patches). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by State wildlife agencies and other partners, will allow real or potential habitat changes from both natural events and management actions to be linked to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to lessen the negative effects with appropriate conservation actions. The WAFWA Zone GRSG Conservation Teams (as described in **Section 1.6.2**) will also be used to advise regional monitoring strategies and data analysis, as described in the plans.

Each ARMPA includes an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are habitat and population thresholds and are based on the two key metrics that are being monitored: habitat condition and population numbers. At a minimum, the BLM will assess annually whether hard and soft trigger thresholds have been met when the population or habitat information becomes available, beginning after this ROD is signed and issued.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the ARMPAs, the BLM will implement more conservative or restrictive conservation measures on a project-by-project basis to mitigate for the specific cause in the decline of populations or habitats, taking into consideration local knowledge and conditions. In each ARMPA, a soft trigger begins a dialogue between the State, FWS, and the BLM to see if the cause can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to prevent tripping a hard trigger, which signals more severe habitat loss or population declines.

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs. In the event that a hard trigger were tripped, the BLM would implement plan-level decisions, such as allocation changes, to immediately institute greater protection for GRSG and its habitat. If a hard trigger were tripped in a PAC that crosses State boundaries, the WAFWA MZ GRSG Conservation Team would convene to discuss causes and identify potential responses.

In the event that new scientific information becomes available, demonstrating that the hard trigger response is insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs, the BLM would immediately assess what further actions may be needed to protect GRSG and its habitat and to ensure that conservation options are not foreclosed. This could include a formal directive, such as an instruction memorandum (IM) or a plan amendment.

1.7 UNIQUE ASPECTS OF THE GREAT BASIN ARMPAS

The ARMPAs and their associated EISs were developed through four planning efforts across the Great Basin Region (as described in **Section 1.1**). To develop these plans, the BLM employed a landscape-scale approach to achieve a common set of management objectives across the range of GRSG recognizing. In particular, it implemented measures to limit anthropogenic disturbance in important habitats. Within this framework, management actions were developed and incorporated into the plans that are tailored to achieve these objectives and accommodate differences in resource conditions, severity of threats, and State-specific management approaches.

This flexible landscape approach provided the opportunity to incorporate recommendations resulting from collaboration with the States and local cooperators and from public comments in each Planning

Area. The plans and their future implementation are strengthened by the contributions of local partners and their knowledge, expertise, and experience.

Measures incorporated into the plans remain consistent with the range-wide objective of conserving, enhancing, and restoring GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat, such that the need for additional protections under the ESA may be avoided.

Below is a brief description of the unique aspects of each of the Great Basin Region's ARMPAs.

Idaho and Southwestern Montana

The Idaho and Southwestern Montana ARMPA adopted specific aspects of the State of Idaho's Conservation Plan for GRSG. The most significant aspect adopted from the State's plan is a third category of habitat referred to as IHMAs. IHMAs are BLM-administered and National Forest System lands that provide a management buffer for PHMAs and connect patches of PHMAs. IHMAs encompasses areas of generally moderate to high conservation value habitat and/or populations.

In a landscape that is most threatened by fire and invasive species, this three-tiered approach allows land managers to focus suppression and restoration resources on those areas of highest importance. It also provides an acceptable additional level of flexibility in IHMAs and GHMAs because surface disturbance due to development is not as great a threat to habitat in the sub-region. The three tiers also are the foundation for an adaptive management approach that includes habitat and population hard and soft triggers. The adaptive management approach requires that when a hard trigger is reached, IHMAs will be managed as PHMAs to maintain sufficient PHMAs to support GRSG populations.

The Idaho portion of the Idaho and Southwestern Montana GRSG ARMPA also includes a unique approach to calculating disturbance to account for effective habitat. This is described in Appendix E of the attached Idaho and Southwestern Montana ARMPA, which the BLM developed in concert with the Idaho Department of Fish and Game, the Forest Service, and the FWS. The ARMPA also includes additional RDFs based on lek avoidance distances, which were developed in coordination with the Idaho Department of Fish and Game and the local FWS office. Examples are avoiding building new wire fences within 2 kilometers of occupied leks and placing new taller structures out of sightlines or at least one kilometer from occupied leks. The BLM will also work with the State of Idaho in setting priorities for reviewing and processing grazing permits and leases in SFAs, consistent with the method recommended by the State of Idaho in its proposed plan for managing BLM-administered lands in the State.

On August 7, 2015, the Sawtooth National Recreation Area and Jerry Peak Wilderness Act was signed into law (House Resolution 1138). In accordance with the Wilderness Act (16 USC, Section 1131 et seq.), certain Federal lands in the Challis National Forest and Challis District of the BLM in Idaho were designated as Wilderness, as a component of the National Wilderness Preservation System, known as the Jim McClure-Jerry Peak Wilderness. Approximately 12,430 acres of this Wilderness area is within BLM-administered SFAs. This area will now also be managed as Wilderness consistent with the Wilderness Act. As specified in the Sawtooth National Recreation Area and Jerry Peak Wilderness Act, a wilderness management plan will be developed within five years of the signing of the act and it will outline specific management guidance for the new wilderness area.

This act also released the Jerry Peak West, Corral-Horse Basin, and Boulder Creek Wilderness Study Areas and they are no longer subject to management, pursuant to Section 603(c) of the FLPMA. The acres of wilderness study areas released include approximately 71,194 acres of PHMAs, 11,923 acres of IHMAs, and 5,912 acres of GHMAs. The ARMPA decisions for these areas will not change as a result of the release.

Finally the Sawtooth National Recreation Area and Jerry Peak Wilderness Act also directed the BLM to convey certain public lands to Blaine County, Custer County, the City of Challis, the City of Clayton, and the City of Stanley. These conveyances include approximately 53 acres of PHMAs, 10 acres of IHMAs, and 828 acres of GHMAs that are reflected in the ARMPA as being administered by the BLM. Once conveyed, these lands will not be subject to the BLM management decisions outlined in the Idaho and Southwestern Montana GRSG ARMPA.

The decisions affecting Southwestern Montana in the ARMPA are consistent with the objectives of the Montana Sage Grouse Habitat Conservation Program (Montana Office of the Governor Executive Order No. 10-2014; State of Montana 2014) by establishing conservation measures and strategies to minimize disturbance and habitat loss, particularly as a result of surface disturbance from energy exploration and development.

The BLM plan will permit the disturbance limit to go from a 3 percent to a 5 percent disturbance cap, consistent with the Montana Plan when the process for implementing that State's disturbance calculation method is instituted and effective. Additionally, if the BLM finds that the State of Montana is implementing an effective GRSG habitat conservation program, the BLM would review their management actions to determine if additional GRSG-related management actions should be adjusted. This would be coordinated with the State of Montana and the FWS to achieve consistent and effective conservation across all lands, regardless of ownership.

Nevada and Northeastern California

The Nevada portion of the Nevada and Northeastern California ARMPA is unique from other Great Basin ARMPAs because of how the sub-regional habitat map was developed. The ARPMA uses the 2014 Coates Maps, developed locally using the best available science. The ARMPA included OHMAs, where RDFs will be applied at the project level. Decisions for BLM-administered lands in California include allocations and management direction that is generally similar to other ARMPAs in the Great Basin, while carrying forward some decisions identified in the Sage Steppe Ecosystem Restoration Final EIS (BLM 2008).

Decisions for BLM-administered lands in Nevada incorporate key elements of the *State of Nevada Greater Sage-Grouse Conservation Plan* (State of Nevada 2014), including consideration of the State of Nevada Conservation Credit System (Nevada Natural Heritage Program and Sagebrush Ecosystem Technical Team 2014) as the ARMPA is implemented and as projects are proposed within the Planning Area. This mitigation strategy focuses restoration on the key areas most valuable to the GRSG. The ARMPA adopts a disturbance management protocol to provide for a 3 percent limit on disturbance. The exception would be in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, the State of Nevada, and the FWS. The plan provides for this exception due to the development of mitigation tools in Nevada, including the Conservation Credit System, in collaboration with the FWS.

Furthermore, given the concurrence of the Nevada Department of Wildlife and FWS in each exception, this approach is consistent with conservation objectives. The Nevada ARMPA does not use a disturbance density cap, required in the three other Great Basin Region ARMPAs, in light of the disturbance management protocol for BLM-administered lands in Nevada.

In coordination with the FWS, the Nevada ARMPA also allows for an exception to the geothermal NSO, which is an energy development priority for the State and is projected to create very limited disturbance in predictable areas over the life of the plan. For those reasons, this exception is consistent with overall conservation objectives.

Utah

The Utah ARMPA incorporates a number of key strategies for GRSG conservation developed by the State of Utah (*Conservation Plan for Greater Sage-Grouse in Utah*; Utah Greater Sage-Grouse Working Group 2013) and the State of Wyoming (Executive Orders 2011-5, 2013-3, and 2015-4), which establish conservation measures for protecting GRSG and also focus conservation and restoration within key areas deemed most valuable to GRSG. The Utah ARMPA also integrates the State's strategic focus on increasing areas available to GRSG through vegetation treatments and reducing threats from wildfire. The ARMPA provides additional flexibility for development in GHMAs because 96 percent of the breeding GRSG in Utah are within PHMAs. Here, conservation measures are applied in a more targeted manner at the project-implementation stage through the use of lek buffers and RDFs, as well as requiring that compensatory mitigation achieve a net conservation benefit outcome. As such, the Utah ARMPA designates GHMAs as open to wind energy and high voltage transmission ROW development (consistent with the net conservation gain mitigation framework for the ARMPA). The Utah ARMPA also designates GHMAs open to oil and gas development with standard constraints.

Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat.

Oregon

The Oregon ARMPA incorporates key elements of the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat* (Hagen 2011). This establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. The BLM plan adopts the unique disturbance cap approach developed with the State of Oregon in which disturbance is capped at 1 percent per decade, in addition to the 3 percent cap in BSUs and project analysis areas.

The BLM Oregon plans provide additional flexibility for wind development in PHMAs in Harney, Lake, and Malheur Counties by allocating them as avoidance areas (rather than exclusion areas) within PHMAs that are outside of the SFAs. In these counties, priority would be placed on locating commercial-scale wind and solar energy development in nonhabitat areas (i.e., outside of PHMAs and GHMAs) before approving development in PHMAs. The BLM provided this flexibility after recognizing the following:

- The extent of high and medium potential wind areas in PHMAs in these counties
- The fact that wind energy is excluded in SFAs in these counties

- After coordinating with the FWS, determining that the more rigorous disturbance cap of 1 percent per decade and adaptive management triggers adopted by the Oregon plan would compensate for the likely limited wind development in these areas

Due to these factors, the BLM finds these limited areas of flexibility for wind development are consistent with overall conservation objectives of the plan. In addition, the Oregon ARMPA identifies strategic areas where habitat enhancement and restoration are encouraged, as well as other strategic areas to address the impacts associated with climate change.

For additional information on the unique aspects of each plan, refer to Table 1-6 of the attached Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah ARMPAs. The tables provide a crosswalk as to how the ARMPAs address specific threats to GRSG identified in the COT Report through these State-specific management prescriptions.

1.8 DECISION RATIONALE

The ARMPAs provide a comprehensive, coordinated, and effective conservation strategy for addressing the threats identified by the FWS such that the need for additional protections under the ESA may be avoided. The ARMPAs contain objectives to conserve GRSG and their habitat on BLM-administered lands across the remaining range of the species. This is consistent with measures identified or recommended in the NTT Report, the COT Report, recent USGS studies, and other relevant research and analysis.

The BLM- and Forest Service-proposed ARMPAs are an essential component to conserve the GRSG and its habitat. This is in combination with the GRSG conservation actions taken by the individual States in the remaining range of the species and initiatives to address the threat of rangeland fire to curb the spread of nonnative invasive grasses and to promote conservation measures to benefit GRSG on private lands. Combined, all of the ARMPAs associated with the BLM's National GRSG Conservation Strategy would affect approximately 66 million acres of the remaining habitat for the species.

The BLM GRSG Conservation Strategy is built on the following key concepts:

- **Landscape-level—**The planning effort encompasses the remaining habitat of the GRSG on BLM-administered lands, covering 10 western states in the Great Basin and Rocky Mountain regions. As such, the strategy provides a coherent framework across the BLM ARMPAs to implement landscape-level conservation for GRSG, while allowing for flexibility essential to effectively address threats to the GRSG in the context of the agency's multiple-use and sustained yield mandates under FLPMA. The conservation measures included as part of this landscape-level conservation effort address identified threats to the species, recognizing local ecological conditions and incorporating existing conservation efforts where they are consistent with the overall objective of conserving GRSG across its remaining range.
- **Best available science—**The ARMPAs are grounded in the best available science, drawn from published literature and input from recognized experts, State agencies, the USGS, the FWS, and other sources. The COT Report provided a blueprint for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat. The NTT Report provided additional guidance for addressing the most significant threats to the GRSG.

The concepts set forth in a number of reports prepared by the USGS regarding specific threats to GRSG, habitat connectivity, and related issues are reflected in the land allocation and resource management decisions. In addition, a series of reports on how to better reduce the threats of rangeland fire and invasive species were prepared in collaboration with the WAFWA. That and a report to the Secretary of the Interior entitled *An Integrated Rangeland Fire Strategy: Final Report to the Secretary of the Interior* informed the GRSG conservation (US Department of the Interior 2015).

- **Targeted, multi-tiered approach—**The ARMPAs were designed to incorporate a layered management approach to target habitat protection and restoration to the most important habitat management areas as determined by State and Federal GRSG experts. These were largely consistent with the PACs identified in the COT Report, where land allocations and management direction avoid and minimize additional surface disturbance. These areas are designated as PHMAs, within which the ARMPAs provide an added level of protection to eliminate most surface disturbance. They accomplish this by delineating SFAs, derived from areas identified by the FWS as strongholds essential for the species' survival. GHMAs recognize the potential value of habitat areas outside of PACs, as recommended by the COT Report, where surface disturbance is minimized, while providing greater flexibility for other land resource uses.
- **Coordinated—**The ARMPAs were developed through a joint planning process between the BLM and the Forest Service (as a cooperating agency). As a result, Federally administered lands essential to the conservation of the GRSG are managed in a coordinated manner. The FWS provided guidance and input throughout the process to aid land managers in understanding the threats to the GRSG and its habitat. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative—**The ARMPAs reflected extensive input from the relevant States, collaborators, and stakeholders and the public from the outset. The ARMPAs were developed with the benefit of input from the individual States and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Western Governors Association Sage Grouse Task Force was particularly useful in facilitating this kind of collaborative input. The ARMPAs incorporate State and local conservation measures where they are consistent with the overall objective of implementing land use plan conservation measures for the GRSG consistent with the multiple-use and sustained yield mission of the BLM.

The conservation measures in the ARMPAs reflect over a decade of research, analysis, and recommendations for GRSG conservation, including those produced by the WAFWA, the NTT, and the COT. Each of these entities produced a strategy or report that was developed through the collaboration of State and Federal biologists and scientists with extensive experience and expertise in GRSG management and research.

The COT Report, which identified threats to GRSG habitat and the most important habitat to protect provided an important framework for developing the conservation strategy embodied in the sub-regional ARMPAs. The COT, consisting of State and Federal scientists, wildlife biologists, resource managers, and policy advisors, was tasked by the FWS Director "with development of range-wide conservation objectives for the sage-grouse to define the degree to which threats need to be reduced or ameliorated to conserve sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future" (FWS 2013).

In addition, the FIAT Report and the USGS compilation and summary of published scientific studies that evaluate the influence of human activities and infrastructure on GRSG populations (*Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review* [Manier et al. 2014], and the *Integrated Rangeland Fire Strategy: Final Report to the Secretary of the Interior* [US Department of the Interior 2015]) provided important guidance in developing critical aspects of the ARMPAs and the overall GRSG landscape-level conservation strategy. Beyond these range-wide reports, each of the sub-regional plans used local science, where available, to tailor plan elements to reflect local ecological conditions, threats, and GRSG management experience where consistent with the overall GRSG conservation objectives.

The BLM ARMPAs are the product of extensive coordination, including the active engagement of the FWS in helping to inform land allocation and related management decisions by the land management agencies to ensure they limit or eliminate new surface disturbance as well as improve habitat condition in the most important habitat areas. The ARMPAs also benefit from strong collaboration with the States and reflect the unique landscapes, habitats, approaches, and priorities in each. While the effort to incorporate State-developed conservation measures in each of the sub-regional plans has added complexity in developing the overall conservation strategy, the body of local knowledge and expertise regarding conservation measures for the GRSG is extensive and, ultimately, strengthened the plans. Incorporating these measures in the plans is also likely to increase the commitment of all partners to the task of implementing the plans on completion.

In his transmittal letter accompanying the final COT Report, the FWS Director reaffirmed his charge. "I asked the team to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. … Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels" (FWS 2013).

The ARMPAs are designed to directly address the specific threats to the species identified by the FWS in its 2010 listing determination as more fully explained in the COT Report and the NTT Report. As previously noted, the COT Report stated "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation." Specifically, the COT Report preparers recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal." They further recommended an "avoidance first strategy" and stressed that "threats in PACs must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy" (FWS 2013).

In order to address the identified threats and meet the recommendations of the COT Report, the plans are based first on the identification of important habitat areas for GRSG in which the plans protect remaining habitat and target habitat restoration and improvement actions. Specifically, the plans identify PHMAs that align closely with PACs identified in the COT Report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report). Within PHMAs, the plans identify SFAs based on the FWS analysis of strongholds for the species based on population density, habitat integrity, and resilience to climate change among other factors. The SFAs serve as a landscape-level anchor for the conservation strategy and are closed or excluded from discretionary surface disturbances. SFAs are also used to prioritize fire protection, habitat restoration, and other habitat management actions (e.g., prioritizing reductions in WHB populations to achieve AML). This approach will allow the BLM to target limited resources to those areas identified by the FWS and reinforced by recent USGS analysis. These resources are those most important to long-term sagebrush ecosystem health and species persistence.

PHMAs and GHMAs boundaries are based on PPH and PGH (except in Utah, where PPH was derived from occupied habitat). Consistent with the BLM's IM 2012-044, PPH and PGH are based on data and maps developed through a collaboration between the BLM and the respective State wildlife agency. PPH and PGH (PHMAs and GHMAs in the Final EISs and now the ARMPAs) were developed using the best available data. Criteria for delineating PPH included breeding bird density (Doherty et al. 2010), GRSG proportionality, lek density, and key seasonal habitats, such as known winter concentration areas. PGH (now GHMAs) are areas of occupied seasonal, connectivity, or year-round habitat outside of PPH.

As discussed in **Section 1.6**, allocations and management actions are targeted to habitat management areas to limit or eliminate surface disturbance. All forms of new development in PHMAs—from energy, to transmission lines, to recreation facilities and grazing structures—are excluded, avoided, or allowed only if the resultant effect is neutral or beneficial to the GRSG. The ARMPAs will also prioritize future oil and gas leasing and development outside of identified GRSG habitat management areas (i.e., SFAs, PHMAs, and GHMAs) to reduce the potential for future conflict with GRSG.

The ARMPAs include additional measures to limit surface disturbance in PHMAs by establishing lek buffers and disturbance limits or caps and density restrictions (except in Nevada) of on average 1 energy facility per 640 acres. These requirements reflect recommendations in the NTT Report and are consistent with certain State strategies that were already in place before the initiation of the BLM's National GRSG Conservation Strategy. As described in **Section 1.6.1**, the BLM determined the appropriate lek buffers to analyze based on the USGS report *Conservation Buffer Distance Estimates for GRSG—A Review* (Manier et al. 2014) based on best available science.

The plans also include actions meant to improve habitat condition to the most important areas for conservation through additional, targeted efforts to protect and restore habitat first in SFAs, then in PHMAs, and finally in areas designated as GHMAs.

Mitigation for activities adversely impacting GRSG or GRSG habitat in PHMAs or GHMAs will be designed to a net conservation gain standard consistent with the recommendation included in the September 2014 FWS document, *Greater Sage-Grouse Range-Wide Mitigation Framework Version 1.0* (FWS 2014b). According to the authors, the Framework was prepared

> "to communicate some of the factors the Service is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to GRSG. The recommendations provided here are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report for sage-grouse" (FWS 2014b).

Grazing, which is the most widespread use of the sagebrush ecosystem, will continue in a manner consistent with the objective of conserving the GRSG. Land health standards will incorporate GRSG habitat objectives and vegetative management objectives consistent with the ecological potential of the landscape as recommended by the COT Report to " . . . conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for GRSG (e.g. shrub cover, nesting cover)" (FWS 2013).

The ARMPAs also address the adverse impacts of free-roaming WHBs on GRSG habitat by prioritizing gathers and removing WHBs to achieve AMLs in SFAs, PHMAs, and GHMAs (in that order). The BLM has been working with the National Academy of Sciences to conduct new research of methods to reduce WHB reproduction rates. Through a combination of targeted gathers and the development of an effective agent for controlling future free-roaming WHB reproductive rates, over time, this threat to GRSG may be effectively managed.

Since the interaction of fire and invasive species represents the primary threat to GRSG survival in the Great Basin region, the ARMPAs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire, including fire prevention and the restoration of habitats impacted by fire. The Department of the Interior took a series of actions over 2014 and 2015 to develop a more complete and comprehensive strategy for dealing with this threat. This led to Secretarial Order 3336 and the subsequent report, *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary of the Interior* (US Department of the Interior 2015).

In accordance with Secretarial Order 3336 and subsequent rangeland fire management strategy, substantial changes in policy and management direction have been made and will continue to be made to enhance BLM's ability to manage the threat of rangeland fire. These will affect all aspects of the rangeland fire management program; they will range from better coordination between resource managers and fire management officers to the identification and prioritization of prevention, suppression, and restoration in SFAs, PHMAs, and GHMAs; to the commitment of additional equipment and crews for rangeland firefighting; to additional funding and policy direction to improve post-fire restoration; to the completion of an initiative to collect, store, and better utilize native seed and sagebrush in post-fire restoration of sagebrush steppe ecosystems. This and the initiative to fight the spread of nonnative invasive species that contribute to higher rangeland fire risk (e.g., cheatgrass) discussed below have fundamentally changed how rangeland fire is managed to benefit sagebrush ecosystems and GRSG habitat.

The COT Report and other more recent research and analysis amplify concern for the contribution of cheatgrass and other invasive annual species to the loss of GRSG habitat associated with increased fire frequency and intensity. Work initiated by the WAFWA and based on recent research by Chambers et al. (2014) led to the development of the FIAT and a subsequent assessment that identified areas of resistance and resilience to fire in SFAs, PHMAs, and GHMAs. Through use of the FIAT Assessment Tool, land managers can more efficiently allocate and use fire resources at initial attack, to stop fire early and prevent catastrophic habitat loss, and to target restoration at those areas important to the species where success is more likely. The BLM is also committed to accelerating the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasive annual species.

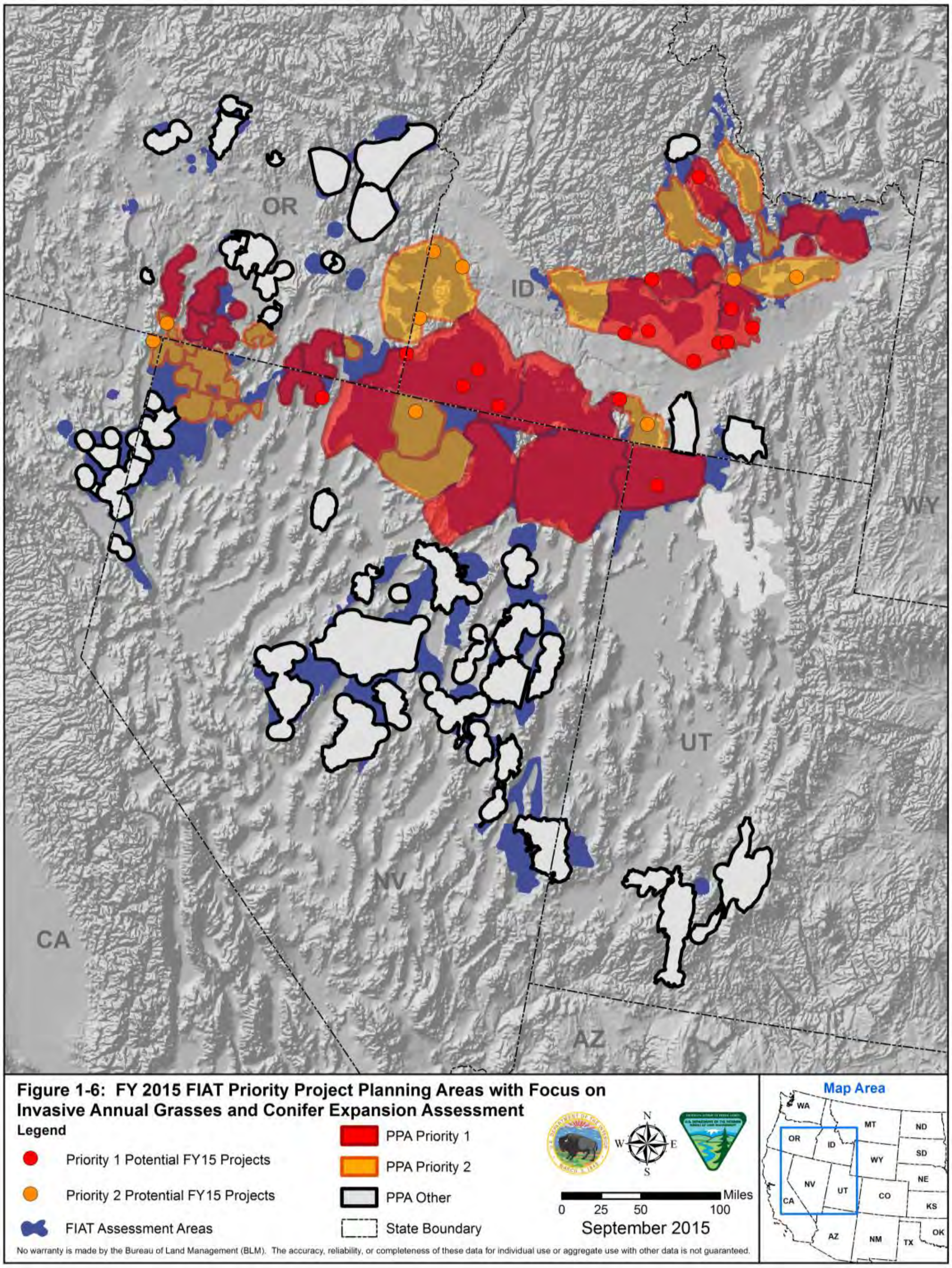
Even prior to completion of the FIAT assessment, the BLM shifted funding for fuels management to protect landscapes of importance to the GRSG. Under the FY 2014 Omnibus Appropriation, the BLM prioritized the funding of treatments and activities within each State that benefit GRSG (see this ROD'

Figure 1-6, FY 2015 FIAT Priority Project Planning Areas with Focus on Invasive Annual Grasses and Conifer Expansion Assessments).

To further supplement these efforts, among other things, the Department of the Interior has recently committed $7.5 million to projects in GRSG habitat to create more resilient landscapes, and the BLM has allocated $12 million to increase firefighting resources aimed at stopping fires while they are small in the Great Basin. In addition, the Department of the Interior has approved policy changes to increase the commitment, flexibility, and time frame for using ES&BAR funding. By adopting a risk-based approach using a rolling average of the acres lost to fire during the previous five fire seasons, ES&BAR funding will be allocated to the BLM to permit an increased focus on the restoration of priority sagebrush-steppe habitats impacted by fire.

In addition, the Sage Grouse Initiative launched by the NRCS in 2010 also contributes to the effort to protect and restore important GRSG habitat. In collaboration with the States and private landowners on private lands and with the BLM and the Forest Service on Federally administered public lands, the NRCS has worked to reduce the encroachment of pinyon-juniper trees and to restore rangeland habitat on private and BLM-administered lands.

Figure 1-6
FY 2015 FIAT Priority Project Planning Areas with Focus on Invasive Annual Grasses and Conifer Expansion Assessments



> Consistent with recommendations contained in the 2006 WAFWA Greater Sage-Grouse Range-wide Conservation Strategy (Stiver et al. 2006), the BLM and Forest Service conservation strategy relies heavily on monitoring and evaluation to assess the success and effectiveness of implementing the management decisions in the ARMPAs. Monitoring plans will be developed in coordination with relevant State and Federal agencies and will incorporate evaluation of GRSG population trends by the States and changes in habitat condition by the Federal land management agencies. The WAFWA report states, "Monitoring provides the 'currency' necessary to evaluate management decisions and to assess progress or problems. Adequate monitoring should be considered an integral and inseparable component of all management actions, and therefore, not optional. Lack of proper monitoring will undoubtedly hinder this large-scale conservation effort" (Stiver et al. 2006).

In addition, the ARMPAs incorporate an adaptive management framework that provides an early warning system of soft triggers to alert resource managers to the need to evaluate the effectiveness of their management strategies should changes occur in population levels or habitat conditions. If the project-level management responses to soft triggers do not adequately address the causes for population or habitat declines and if hard triggers are reached, the ARMPAs identify measures that will be put in place, including plan-level responses, in an effort to reverse the declines.

In summary, the ARMPAs emphasize an "avoidance first" strategy, consistent with the recommendations in the COT Report, by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is done by identifying important GRSG habitat areas, then applying allocations that exclude or avoid surface-disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which, although more difficult and requiring a longer time frame, is important to the long-term conservation of GRSG.

Restoration decisions include specific habitat objectives and making it a priority to treat GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* (US Department of the Interior 2015) as well as the NRCS's Sage Grouse Initiative investments in private landowners' conservation efforts. This strategy reflects a high level of commitment by Federal partners to conserve GRSG and its habitat. The actions on Federal lands, which constitute nearly two-thirds of the most important lands for GRSG conservation, will anchor and complement the significant actions being taken by State and local governments and private landowners to conserve the species and its habitat.

The landscape-level strategy consisting of new conservation actions that will go into effect through the BLM ARMPAs, as well as actions being implemented currently to conserve the species, reflect a significant change in management direction and philosophy for the BLM since 2010 and a long-term commitment to assure the conservation of the species by protec[illegible] restoring, and enhancing GRSG habitat consistent with the objectives set in the 2006 WAFWA conservation strategy and embraced by both the NTT and the COT.

This change represents a new model for the BLM in managing the sagebrush landscape. It amplifies the need for collaboration among Federal, State, tribal, and private partners to conserve the GRSG, which is consistent with direction articulated in the NTT Report, as follows:

> "Land uses, habitat treatments, and anthropogenic disturbances will need to be managed below thresholds necessary to conserve not only local sage-grouse populations, but sagebrush communities and landscapes as well. Management priorities will need to be shifted and balanced to maximize benefits to GRSG habitats and populations in priority habitats. Adequacy of management adjustments will be measured by science-based effectiveness monitoring of the biological response of sagebrush landscapes and populations. Ultimately, success will be measured by the maintenance and enhancement of sage-grouse populations well into the future" (NTT 2011, p. 6-7).

The benefits of conserving the sagebrush ecosystem and GRSG habitats resulting from the BLM ARMPs and ARMPAs provide an essential foundation for conserving the GRSG. This, in conjunction with the amended Forest Service Land and Resource Management Plans (LRMPs), affects nearly two-thirds of GRSG habitat across the remaining range of the species. In conjunction with similar conservation efforts by other Federal and State agencies, private landowners, and local partners, the BLM National GRSG Conservation Strategy constitutes a historic conservation effort; it will benefit more than 350 species and the sagebrush ecosystem on which they depend. It is through these landscape-level, science-based, collaborations to conserve the imperiled sagebrush ecosystem that conservation of the GRSG and other sagebrush obligate species can best be achieved and the listing of the GRSG under the ESA may be avoided.

1.9 IMPLEMENTATION

Future decisions made in conformance with the ARMPAs serve to continuously and actively implement its provisions. Management decisions can be characterized as *immediate* or *one-time future* decisions.

Immediate Decisions—These decisions are the land use planning decisions that go into effect when the ROD is signed. These include goals, objectives, allowable uses, and management direction, such as the allocation of lands as open or closed for salable mineral sales, lands open with stipulations for oil and gas leasing, and OHV area designations. These decisions require no additional analysis and guide future land management actions and subsequent site-specific implementation decisions in the Planning Area. Proposals for future actions, such as oil and gas leasing, land adjustments, and other allocation-based actions, will be reviewed against these RMP decisions to determine if the proposal is in conformance with the plan.

One-Time Future Decisions—These are the types of decisions that are not implemented until additional decision-making and site-specific analysis is completed. Examples are implementation of the recommendations to withdraw lands from locatable mineral entry or development of travel management plans. Future one-time decisions require additional analysis and decision-making and are prioritized as part of the BLM budget process. Priorities for implementing one-time RMP decisions will be based on the following criteria:

- Relative importance of the action to the efficacy of the GRSG conservation strategy
- National BLM management direction regarding plan implementation
- Available resources

General Implementation Schedule of One-Time Decisions—Future Decisions discussed in the attached ARMPAs will be implemented over a period of years, depending on budget and staff availability. After issuing the ROD, the BLM will prepare implementation plans that establish tentative time frames for completing one-time decisions identified in these ARMPAs. These actions require additional site-specific decision-making and analysis.

This schedule will assist BLM managers and staff in preparing budget requests and in scheduling work. However, the proposed schedule must be considered tentative and will be affected by future funding, changing program priorities, nondiscretionary workloads, and cooperation by partners and external publics. Yearly review of the plan will provide consistent tracking of accomplishments and will provide information that can be used to develop annual budget requests to continue implementation.

1.9.1 Additional Implementation Guidance and Considerations

Instructional Memoranda—Additional instruction and management direction will be necessary to implement certain land allocation decisions and management direction included in the ARMPAs. For example, additional guidance will be provided to clarify how the BLM will implement the objective of prioritizing future oil and gas leasing and development outside of GRSG habitat. IMs and related guidance will be completed by The BLM Washington Office. The BLM will complete IMs for the following management direction with the intent of completing these IMs within 90 days of the RODs: oil and gas leasing and development prioritization and livestock grazing. Other IMs, including monitoring and mitigation, will be developed as necessary. Issuance of this national guidance will supersede any related national and field level guidance currently in effect. Additional national, state, and field level guidance will be developed as necessary to implement the decisions in the plans.

Map Adjustments and GRSG Seasonal Habitats—PHMAs were designed to include breeding bird density, GRSG proportionality, density of leks, and key seasonal habitats, such as known winter concentration areas. GHMAs were designed to include the areas of occupied seasonal, connectivity, or year-round habitat outside of PHMAs. As additional important habitats are identified (e.g., winter habitat and key connectivity areas), the BLM will map and incorporate these habitats for GRSG, consistent with best available science, through subsequent plan maintenance, revision, or amendment, as appropriate. Priority should be given to ensuring that wintering habitat is identified and captured in all changes in habitat maps subsequent to this decision. In the interim, the BLM will use the existing maps for all decisions.

Continued Commitment to Research and Use of Best Available Science—Through implementation of this strategy, new management issues and questions are likely to arise that may warrant additional guidance or study by technical experts, scientists, and researchers. The BLM is committed to continue working with individuals and institutions with expertise in relevant fields in order to ensure that land and resource management affecting conservation of the GRSG and the sagebrush ecosystem continues to be guided by sound peer-reviewed research and the best available science.

Training—Given the nature and complexity of the management direction in these ARMPAs, the BLM, in collaboration with the Forest Service and the FWS, will develop and implement a schedule of training for key functions, actions, and decisions associated with these plans. In this manner, the BLM will seek to better inform its personnel, partners, cooperators, and stakeholders of the changes in management that will result from this new management model.

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2. DECISION

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CHAPTER 2
DECISION

2.1 SUMMARY OF THE APPROVED MANAGEMENT DECISIONS

The decision is hereby made to approve the Great Basin Region GRSG ARMPAs for the Great Basin Region GRSG Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments 1 through 4). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in Sections 1.1 of attachments 1 through 4.

The land use decisions conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and objectives (desired outcomes) and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective when this ROD is signed, implementing on-the-ground activities requires additional steps before any of them can begin. The BLM will conduct NEPA analyses, as necessary, for such implementation decisions.

2.2 WHAT THE ROD AND ARMPAS PROVIDE

The ARMPAs include GRSG and GRSG habitat land use plan-level management decisions in the form of the following:

- Goals
- Objectives (desired future conditions)
- Land use allocations and allowable uses
- Management actions

Goals are the broad statements of desired outcomes and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have time frames for achievement.

Land use allocations specify locations in the Planning Area that are available or unavailable for certain uses and are also used to prioritize conservation and restoration management actions. Examples are decisions on the following:

- What lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development
- What lands may be available for disposal via exchange or sale
- What lands are open, closed, or limited to motorized travel

Note that all acreages presented in the approved plans are estimations, even when they are presented to the nearest acre.

Management decisions and actions are those provisions that help in meeting the established goals and objectives. They are the measures that will be applied to guide day-to-day activities on public lands, including but not limited to, stipulations, guidelines, best management practices, and RDFs.

The ARMPAs' management decisions were crafted to incorporate conservation measures into RMPs to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing identified threats to GRSG and their habitats (see **Section 1.3**).

The EISs conducted for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Amendments sufficiently disclose and analyze all environmental issues associated with mineral leasing on Forest Service-administered lands. The issues would be relevant should the Forest Service consent to a lease or require consultation before it issues a lease. This would comply with applicable mineral leasing and NEPA regulations and would be subject to further site-specific environmental analysis where applicable.

2.3 WHAT THE ROD AND ARMPAS DO NOT PROVIDE

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for land use plan-level travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not violate valid existing rights nor contain decisions for the mineral estates that are not administered by the BLM. ARMPA decisions for surface estate only apply to BLM-administered lands. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions are the following:

- *Statutory requirements*—The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy*—The decision will not change the BLM's obligation to conform to current or future national policy.
- *Funding levels and budget allocations*—These are determined annually at the national level and are beyond the control of the State District or Field Offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. They generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may be stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 MODIFICATIONS AND CLARIFICATIONS

The ARMPAs in the Great Basin Region include minor modifications and clarifications to the Proposed RMPAs. These minor modifications and clarifications were made as a result of internal reviews, response to protests, and recommendations provided to the BLM during the Governors' consistency reviews. These modifications and clarifications are hereby adopted by this ROD.

The following modifications and clarifications were made to all of the ARMPAs in the Great Basin Region:

- *ARMPA Formatting*—The plans were reformatted between the Proposed RMPA and ARMPA planning stages for consistency across the Great Basin Region. The order of management actions and the prefixes for the goals, objectives, and management actions were changed in the ARMPAs to provide consistency among the amendments and revisions for GRSG goals and objectives.
- *Forest Service References (applicable only to the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah ARMPAs)*—All references to National Forest System lands in both text and on maps have been removed from the ARMPAs. The Forest Service has completed two separate RODs and land and resource management plan amendments under its planning authorities.
- *Fire*—Management actions and decisions were modified to stress that protecting human life is the single overriding priority for fire and fuels management activities.
- *Livestock Grazing*—The statement, "This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3," was added to the management action and decision. It reads, "At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks."
- *Glossary*—Numerous glossary definitions were deleted because they were not used or referenced in the ARMPAs. If not already contained in the Proposed RMPAs' glossaries, the following terms and definitions were added to the glossary for clarification:
    - **Grazing Relinquishment.** The voluntary and permanent surrender by an existing permittee or lessee, (with concurrence of any base property lienholders), of their priority (preference) to use a livestock forage allocation on public land as well as their permission to use this forage. Relinquishments do not require the consent or approval of the BLM. The BLM's receipt of a relinquishment is not a decision to close areas to livestock grazing.

  - **Transfer of Grazing Preference.** The BLM's approval of an application to transfer grazing preference from one party to another or from one base property to another or both. Grazing preference means a superior or priority position against others for the purposes of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee.
  - **Valid Existing Right.** Documented legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include, but are not limited to, fee title ownership, mineral rights, ROWs, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.
  - **Mining Claim.** A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the 1872 Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, mill site, and tunnel site.
  - **Energy or Mining Facility.** Human-constructed assets designed and created to serve a particular function and to afford a particular convenience or service that is affixed to a specific locations, such as oil and gas well pads and associated infrastructure.

- *GRSG Habitat Mapping*—Information was added to the ARMPAs to specify that when new information becomes available about GRSG habitat, including seasonal habitats, in coordination with the State wildlife agency and FWS, and based on best available scientific information, the BLM may revise the GRSG habitat management area maps and associated management decisions through plan maintenance or plan amendment or revision, as appropriate.
- *Adaptive Management*—The GRSG Adaptive Management Strategy was revised to include a commitment that the hard and soft trigger data will be evaluated as soon as it becomes available after the ROD is signed and then will be analyzed, at a minimum, annually thereafter.
- *Vegetation*—The desired condition for maintaining a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover in SFAs and PHMAs was modified to read as follows: "In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush canopy cover, consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health" (BLM Tech Ref 1734-6; Pellant 2005).
- *GRSG Habitat Objectives*—For clarification purposes, within each of the ARMPA GRSG habitat objectives tables, native bunchgrass was provided as an example of a perennial grass cover and residual grass was added to the perennial grass cover and height objective.
- *Sagebrush Focal Areas*—Examples of the types of vegetation and conservation actions that will be prioritized within SFAs were provided for clarity in the management action and

decision. These examples were land health assessments and WHB management and habitat restoration actions.

- *Required Design Features*—One of the criteria for demonstrating that a variation to an RDF is warranted was modified to include the following statement: "An alternative RDF, a state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat."
- *Lands and Realty*—The following management actions and decisions and objectives were clarified:
  - Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.
  - Within existing designated utility corridors, the 3 percent disturbance cap may be exceeded at the project-scale if the site-specific NEPA analysis indicates that a net conservation gain to the species would be achieved. This exception is limited to projects that fulfill the use for which the corridors were designated (e.g., transmission lines and pipelines) and the designated width of a corridor would not be exceeded as a result of any project collocation.
- *Land Tenure*—Management action associated with land disposals was clarified to include land exchanges as a means of disposal.
- *WAFWA GRSG Conservation Team*—Additional clarification was added to ARMPAs related to the WAFWA GRSG Conservation Teams that were identified in the Proposed RMPAs: "WAFWA management zones will be used to facilitate cross-state issues, such as regional mitigation and adaptive management monitoring and response, through WAFWA GRSG Conservation Teams. These teams will convene and respond to issues at the appropriate scale and will use existing coordination and management structures to the extent possible."
- *Cheatgrass*—The following management action was included consistent with the purpose and need and objectives of the ARMPAs: "Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species."
- *Valid Existing Rights*—The following management action was added to the ARMPAs: "Consider the likelihood of developing not-yet-constructed surface-disturbing activities, as defined in Table 2 of the Monitoring Framework, under valid existing rights before authorizing new projects in PHMAs."

Additional modifications and clarifications specific to each sub-region ARMPA are summarized below.

2.4.1 Idaho and Southwestern Montana

General Changes

- All exception language that was in the Final EIS in various places was grouped into a stipulation appendix and added to the ARMPA as Appendix G Stipulations.
- Appendix G, Anthropogenic Disturbance and Adaptive Management from the Proposed RMPA, which is now Appendix E in the ARMPA, was modified to delete the reference to

Tables 2 to 7. These tables were deleted from the Final EIS Appendix G before it was made available to the public for protest, but the reference was not deleted in the appendix text. This discrepancy was identified during protest resolution and the Governor's consistency review. These values will be calculated after the ROD is signed (see Adaptive Management below).

- Many editorial changes, including deleting repeated numbers and correcting spelling errors, were made when finalizing the ARMPA.
- On August 7, 2015, President Obama signed into law the Sawtooth National Recreation Area and Jerry Peak Wilderness Act (House Resolution 1138). In accordance with the Wilderness Act (16 USC, Section 1131 et seq.), certain Federal lands in the Challis National Forest and Challis District of the BLM in Idaho, comprising approximately 116,898 acres, were designated as Wilderness, as a component of the National Wilderness Preservation System, known as the Jim McClure-Jerry Peak Wilderness.

  This bill also released the Jerry Peak West, Corral-Horse Basin, and Boulder Creek Wilderness Study Areas, and they are no longer subject to Section 603(c) of the FLPMA.

  Finally the Sawtooth National Recreation Area and Jerry Peak Wilderness Act also directed the BLM to convey certain public lands to Blaine and Custer Counties and the Cities of Challis, Clayton, and Stanley. These conveyances include approximately 53 acres of PHMAs, 10 acres of IHMAs, and 828 acres of GHMAs that are reflected in the ARMPA as being administered by the BLM. Once conveyed, the BLM will adjust the maps and acres as they appear in the ARMPA through plan maintenance to depict that these lands are not subject to the BLM management decisions outlined in the Idaho and Southwestern Montana GRSG ARMPA.

Special Status Species

- The Seasonal Timing Restrictions from Appendix C of the Final EIS were deleted to reduce redundancy because these restrictions were already in the RDFs appendix.

Livestock Grazing

- Livestock Grazing RM 16 and RM 18, which are now MD LG 15 and MD LG 17 in the ARMPA, had the following sentence added as an accepted recommendation made during the Governor's consistency review to clarify management and conservation action prioritization in SFAs: "Management and conservation action prioritization will occur at the Conservation Area (California) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFAs followed by areas of PHMAs outside SFAs."

Lands and Realty

- Lands and Realty LR-14 from the Proposed RMPA, which is now MD LR 13 in the ARMPA, was modified to remove the statement that lands in PHMAs, IHMAs, and GHMAs would be available for disposal only through exchange. This was removed because it was not consistent with BLM policy, and the net conservation gain clause in MD LR-13 would ensure that disposals through any method would be beneficial to GRSG.

2.4.2 Nevada and Northeastern California

General Changes

- Editorial changes, such as changing should to shall and would to will, to reflect the final decision language.
- Re-categorizing some of the management decisions into other common resource programs. For example, all of the fire and fuels management decisions are numbered under FIRE and are not split into different subcategory names.
- Re-lettering the critical appendices and deleting those that are no longer applicable to the ARMPA.

Special Status Species

- Added clarity to MD SSS 2A 3 by describing the energy and mining facilities where this decision would be applicable; taken directly from the Disturbance Appendix E.
- Added clarity to MD SSS 3A by including references to valid existing rights and applicable law for the requirement of a net conservation gain.
- Specified in MD SSS 8 that this activity would be coordinated with the Nevada Department of Wildlife or California Department Fish and Wildlife and that breeding activity surveys would be done for actions involving mineral activities and ROWs.
- Deleted Action PR 4 from the Proposed RMPA because the BLM does not manage landfills and transfer stations.
- Under the Brood-Rearing/Summer category, clarified that the objective of the 7-inch-deep, rooted perennial bunchgrass in upland habitats was only for a 522-foot (200 meter) area around riparian areas and meadows. The additional reference was added for Casazza et al. 2011.
- Footnote #7 was deleted. The original footnote stated that the "specific height requirements needed to meet the objective will be set at the time of habitat assessment framework assessments." This is incorrect because the height requirements will need to be set well in advance of the habitat assessment framework assessments.
- A new footnote was added as footnote #1: "Any one single habitat indicator does not define whether the habitat objective is or is not met. Instead, the preponderance of evidence from all indicators within that seasonal habitat period must be considered when assessing sage-grouse habitat objectives." This addition was for the purpose of clarification.

Adaptive Management

- Clarified under MD SSS 21 that the BLM will coordinate with the Nevada Department of Wildlife and that the decision was specific to mineral activities and ROW actions.

Fire and Fuels Management

- Deleted "Field Offices" and "Districts" from MD FIRE 3, as there will be a multilayered approach to coordination, including BLM State Offices.

- In Objective FIRE 3, added "in SFAs first" to provide more emphasis to the SFAs over the rest of the PHMAs for this action.
- Modified MD FIRE 26 to delete "Districts," as there will be a multilayered approach to identifying treatment needs for wildfire and invasive species management across the State.
- Added "FWS" as a coordination entity to MD FIRE 31, when ensuring that proposed sagebrush treatments are coordinated with the BLM and State fish and wildlife agencies.

Livestock Grazing

- Management Decision LG 1 was modified for clarity and to include the fact that the BLM would conduct appropriate consultation, cooperation, and coordination.
- Management Decision LG 5 was modified to add supplementary management actions and clarifies that the potential modifications include "but are not limited to" to actions on the list.
- Management Decision LG 5 was modified to make it clear that the management strategies listed are not limited to just those listed under LG 5 by adding "but are not limited to." This was added to clarify a misunderstanding in a protest letter.
- Management Decision LG 7 was clarified to state that "AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested."
- Management Decision LG 15 was modified to state that removing or modifying water developments must be done "In accordance with state water law and…"

Mineral Resources

- Management Decision MR 18 was modified to provide the Barrick Enabling Agreement (March 2015) as an example of appropriate mitigation that can be considered in the future, and the last sentence was removed because it only repeated BLM regulations and is unnecessary.

Lands and Realty

- In order to resolve a protest, MD LR 3 was modified to state that corridors will be 3,500 feet wide "or a different width is specified for congressional designated corridors." This is in response to the Lincoln County Conservation Recreation Development Act (2204), which included congressionally designated corridors that were not included in the plan amendment or the corridor map. The corridor map (Figure 2-10) was also modified to reflect the corridors tied to this act.
- Action LR-LUA 21 from the Proposed Plan was deleted because the Federal Highway Administration and the Nevada Department of Transportation already have valid existing rights associated with their easements and ROWs, and this planning effort would not change the terms and conditions of their existing easements or ROWs. Making this a management action is repetitive and unnecessary.

Travel and Transportation

- Due to confusion that was outlined in protest letters and in the Governor's consistency review, MD TTM 2 was clarified to say that limiting off-highway travel to existing routes in

PHMAs and GHMAs would be "subject to valid existing rights, such as for a mine under a plan of operations."

- Additional language was added to MD TTM 3 to make it clear that the bulleted "guidelines will be considered when undertaking future implementation-level travel planning." This was in response to protest misunderstandings. In addition, bullet three was amended by deleting "developed in this plan amendment," as the criteria is not developed through the plan amendment.

Mitigation

- In order to provide consistency across the Great Basin Regional Planning Area, the two mitigation management decisions were removed from the Adaptive Management, Monitoring, and Mitigation section of Chapter 2 in the Proposed RMPA (these are now separate appendices) and inserted as management decisions independently under the Mitigation section.

2.4.3 Oregon

Lands and Realty

- A typographical error in the socioeconomic analysis of the Proposed RMPA was identified during the protest period. Correction to this error in Section 4.20.3, page 4-345, is as follows: Paragraph beginning "Restrictions to ROW development under Alternatives B, C, D, E, F, and the Proposed Plan…" is replaced with the following:

  "Proposed management under Alternatives B, C, D, E, F, and the Proposed Plan could require investors to consider alternative power line ROW alignments or designs that could increase the costs of constructing new infrastructure. A 2012 WECC study, for example, provides information on transmission line construction costs per mile, which range from $927,000 to $2,967,000 depending on voltage and whether lines are single or double circuit lines. The same study provides cost multipliers for difficult terrains, reaching up to 2.25 in the case of forested lands (WECC 2012). Utilities and other infrastructure investors typically pass these costs on to consumers. Where the rate base is smaller, such as in rural areas, per-customer rate impacts associated with constructing a 10-mile, 230kV transmission line, for example, would be greater compared to the economic impacts on rate payers served by a larger metropolitan utility proposing the same line. Under Alternatives B, C, D, E, and the Proposed Plan, rate payers serviced by local utility providers with small rate bases would be impacted more by costs associated with added route lengths or infrastructure design requirements compared with rate payers serviced by larger, multi-State providers. Where technically and financially feasible, Alternatives B, D, and the Proposed Plan identify burial of power lines as a design option to mitigate impacts on GRSG. New construction costs of underground transmission lines can be between 4 and 14 times higher compared to new overhead construction (PSC 2011), depending on terrain. In rural areas, burial of new distribution lines would be more than double the cost of new overhead construction. Burying existing distribution lines would likely cost between $400,000 and $500,000 per mile in rural areas (EIA 2012). Under all alternatives, where burying new lines would be technically unfeasible or result in costs that could not be absorbed by the rate payers, infrastructure investors would explore other route or design options that avoid impacts to GRSG habitat."

Renewable Energy

- Managed Decision RE-2 was modified to include the statement, "In Harney, Lake, and Malheur Counties, priority would be placed on locating commercial scale wind and solar energy development in non-habitat areas first (i.e., outside of PHMAs and GHMAs) before approving development in PHMAs."

Special Status Species (Greater Sage-Grouse)

- Objective SSS 6 was modified to clarify that the BLM will coordinate with the State of Oregon regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring related to adaptive management and human disturbances. This modification was recommended during the Governor's consistency review.

Leasable Mineral Resources

- Based on internal review, MLS 7 from the Proposed RMPA, which is now MD MR 7 in the ARMPA, was modified to include all fluid mineral lease development, including geothermal permits to drill.

2.4.4 Utah

General Changes

- Throughout the Proposed RMPA, the words "would," "could," "should," and "may" were generally removed or revised to reflect the *active* management direction of an ARMPA rather than *potential* management presented when the Proposed RMPA was one of many alternatives that the agency could select.
- Language was added to Objective SSS-3 (Objective GRSG-3 in the Proposed RMPA), MA-SSS-4 (MA-GRSG-4 in the Proposed RMP Amendment), MA-SSS-6 (MA-GRSG-6 in the Proposed RMPA), Objective VEG-1, MA-VEG-1, MA-FIRE-3 and MA-FIRE-4 to clarify that landscapes that include populations of both GRSG and Utah prairie dog, a Federally listed species, be managed for the benefit of both species. This addition is included to ensure that this objective is included in all applicable objectives and management actions, not just the five actions in the Proposed RMPA where this concept and language was already present.
- Throughout the Proposed RMPA there were a number of references to coordinating with the State of Utah, Division of Wildlife Resources, or State biologists. These were all revised to note that such coordination would be with "the appropriate State of Utah agency." This clarification was made at the request of the Governor during his consistency review.
- The Proposed RMPA introduced the term biologically significant unit (BSU) for adaptive management and the disturbance cap to provide a consistent approach for managing and monitoring across the GRSG range. In the Utah Sub-Region, the boundaries of the BSUs follow the population area boundaries within PHMAs. As part of resolving protests, the ARMPA was revised to note that BSUs are PHMAs within population areas. Whenever the

term BSU was used, it was replaced with the more descriptive text, with a parenthetical reference to BSUs for the purposes of coordinating across State lines.

Special Status Species (formerly Greater Sage-Grouse)

- Objective GRSG-1 from the Proposed RMPA, which is now Objective SSS-1 in the ARMPA, was changed to remove reference to WAFWA MZs when addressing designation of PHMAs. This change was made during the Governor's consistency review to more closely reflect the management in the State of Utah's Conservation Plan for GRSG in Utah (2013).
- MA-GRSG-1 from the Proposed RMPA, which is now MA-SSS-1 in the ARMPA was revised to include the following text: "The BLM will apply these goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate." This is consistent with the planning criteria contained in the sixth bullet on page 1-20 of the Final EIS. This language was added based on an accepted recommendation made by the Governor during the Governor's consistency review.
- The language of MA-GRSG-1 from the Proposed RMPA, which is now MA-SSS-1 in the ARMPA, regarding nonhabitat areas within PHMAs and GHMAs was revised to clarify the intent of the action. This revision was made as a result of internal reviews to ensure the text more accurately reflected the intent behind the management action.
- The introductory language of MA-GRSG-3 from the Proposed RMPA, which is now MA-SSS-3 in the ARMPA, was revised to clarify the intent of the action. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action and to focus on land uses that have been identified as threats to GRSG.
- The language of MA-GRSG-3e from the Proposed RMPA, which is now MA-SSS-3e in the ARMPA, was revised to clarify the intent of the noise restrictions. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action to focus on land uses that have been identified as threats to GRSG. Further, language was added to identify when "ambient" noise levels would be assessed to avoid managing for continual incremental increases in noise levels.
- The language of MA-GRSG-6 from the Proposed RMPA, which is now MA-SSS-6 in the ARMPA, was revised to clarify the intent of GRSG management outside PHMAs/GHMAs. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action. The purpose of this action is to provide direction for managing areas outside PHMAs and GHMAs that have been treated to improve GRSG habitat. The change was necessary to avoid the implication of changing allocations or altering PHMA and GHMA boundaries outside a planning process, while minimizing conflicting land uses in areas where an investment in increasing GRSG habitat have been made.

Livestock Grazing

- The language of MA-GRA-6 from the Proposed RMPA, which is now MA-LG-6 in the ARMPA, was revised. The concepts and intent did not change, but the text was revised to align with similar concepts and intent in the livestock grazing sections in GRSG amendments throughout the Great Basin.

2.5 PROTEST RESOLUTION

The BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by the BLM's planning decisions to protest proposed planning decisions within 30 days of when the notice of availability of the Proposed RMP/Final EIS was published in the *Federal Register* (May 29, 2015).

The BLM Director concluded that the BLM had followed all applicable laws, regulations, and policies and had considered all relevant resource information and public input in developing the Proposed RMPAs/Final EISs. Each protesting party has been notified in writing of the Director's findings and the disposition of their protests. The Director resolved the protests without making significant changes to the Proposed RMPAs/Final EISs, though minor clarifications were made and are summarized in **Section 2.4**. The Director's decisions on the protests are summarized in each of the Proposed RMPAs/Final EISs Director's Protest Resolution Reports, which are available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Below are descriptions of the protest resolution process for each of the four Great Basin Region Proposed RMPAs/Final EISs.

2.5.1 Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed RMPA/Final EIS, the BLM Director received 20 timely protest submissions. All of the protesting parties had standing; however, one submission was dismissed as it did not contain any valid protest points, pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report are as follows:

- Compliance with FLPMA
- Compliance with NEPA
- Compliance with ESA
- Density and disturbance
- Adaptive management
- GRSG habitat objectives
- Livestock grazing
- Mitigation
- Compliance with the Administrative Procedure Act
- Compliance with the Energy Policy Act of 2005
- Areas of critical environmental concern
- Fire and fuels management
- Fluid minerals
- Solid minerals
- Special status species
- Lands and realty

- Travel and transportation management

2.5.2 Nevada and Northeastern California

For the Nevada and Northeastern California GRSG Proposed RMPA/Final EIS, the BLM Director received 40 timely protest submissions. All of the protesting parties had standing; however, two submissions were dismissed as they did not contain any valid protest points, pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report are as follows:

- Compliance with FLPMA
- Compliance with NEPA
- Compliance with ESA
- Density and disturbance
- Adaptive management
- GRSG habitat objectives
- Livestock grazing
- Mitigation
- Compliance with the Administrative Procedure Act
- Compliance with the Energy Policy Act of 2005
- Air quality
- Climate change
- Noise
- Areas of critical environmental concern
- Solid minerals
- Special status species
- Lands with wilderness characteristics
- Lands and realty
- Tribal issues
- WHBs
- Travel and transportation management

2.5.3 Oregon

For the Oregon GRSG Proposed RMPA/Final EIS, the BLM Director received 30 timely protest submissions. All of the protesting parties had standing; however, three submissions were dismissed as they did not contain any valid protest points, pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report are as follows:

- Compliance with FLPMA

- Compliance with NEPA
- Compliance with ESA
- Density and disturbance
- Monitoring
- Areas of critical environmental concern
- Fire and fuels management
- Solid minerals
- Special status species
- Travel and transportation management

2.5.4 Utah

For the Utah GRSG Proposed RMPA/Final EIS, the BLM Director received 43 timely protest submissions. All of the protesting parties had standing; however, three submissions were dismissed as they did not contain any valid protest points, pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report are as follows:

- Compliance with FLPMA
- Compliance with NEPA
- Compliance with ESA
- Density and disturbance
- Adaptive management
- Land use allocations
- GRSG habitat objectives
- Livestock grazing
- Mitigation
- Compliance with the Administrative Procedure Act
- Compliance with the Energy Policy Act of 2005
- Air quality
- Climate change
- Noise
- Areas of critical environmental concern
- Fire and fuels management
- Fluid minerals
- Solid minerals
- Special status species

- Lands and realty
- Travel and transportation management
- Reasonable foreseeable development scenarios

2.6 GOVERNOR'S CONSISTENCY REVIEW

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other Federal agencies, state and local governments, and Indian tribes, so long as the guidance and resource management plans also are consistent with the purposes, policies, and programs of Federal laws and regulations applicable to public lands" (43 CFR 1610.3-2[a]).

The general requirement in FLPMA planning regulations is to coordinate the land use planning process with plans of other agencies, States, and local governments to the extent consistent with law (see FLPMA Section 202[c][9] and CFR 1610.3-1[a]) and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with Federal law or to the maximum extent practical; see CFR 1610.3-2[a][b]). In accordance with FLPMA, the BLM was aware of and gave consideration to State, local, and tribal land use plans and provided meaningful public involvement throughout the development of the Proposed RMPAs/Final EISs.

The BLM is aware that there are specific State laws and local plans relevant to aspects of public land management that are discrete from, and independent of, Federal law; however, the BLM is bound by Federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that the BLM's land use plans be consistent with officially approved State and local plans only if those plans are consistent with the purposes, policies, and programs of Federal laws and regulations applicable to public lands.

Where officially approved State and local plans or policies and programs conflict with the purposes, policies, and programs of Federal laws and regulations applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially approved State and local policies and programs (as opposed to plans), this consistency provision applies only to the maximum extent practical. While county and Federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the Federal agency planning process is not bound by or subject to State or county plans, planning processes, policies, or planning stipulations.

The 60-day Governor's consistency review period ended on July 29, 2015. In the Great Basin Region, the Governors of Idaho, Nevada, Oregon, and Utah submitted letters to their respective BLM State Directors, asserting inconsistencies between the BLM's Proposed RMPAs and their State's or local governments' resource-related plans, policies, and procedures, as well as other concerns that they had with the proposed planning documents.

On August 6, 2015, the BLM State Directors notified the Governors as to whether their recommendations were accepted or rejected. These Governors were then provided with 30 days to appeal the BLM State Director's decisions to the BLM Director. On September 8, 2015, the BLM Director received appeals from the Governors of Idaho and Nevada; on September 11, 2015, the BLM Director received an appeal from the Governor of Utah. The BLM Director reviewed these appeals and rejected the recommendations of the Governors of Idaho, Nevada, and Utah by letters dated

September 16, 2015, before this ROD was issued. The BLM Director's response to these appeals will also be published in the *Federal Register* after this ROD is issued.

In some instances, modifications to the ARMPAs were addressed based on recommendations submitted to the BLM by the applicable Governors. These modifications were made and are summarized in **Section 2.4**.

3. ALTERNATIVES

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CHAPTER 3
ALTERNATIVES

3.1 ALTERNATIVES CONSIDERED

Each of the Great Basin sub-regional planning efforts analyzed in detail a set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs. Their intent was to meet purpose and need of this planning to identify and incorporate appropriate management direction in land use plans to conserve, enhance, and restore GRSG habitat. This would be accomplished by reducing, eliminating, or minimizing threats to GRSG habitat. All management considered under any of the alternatives complied with Federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping and to maintain or increase GRSG abundance and distribution in the Planning Area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions, constituting a separate RMP amendment. The goal was met to varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law, there are typically few or no distinctions between alternatives.

3.1.1 Alternative A—No Action Alternative

Alternative A meets the CEQ requirement that a no action alternative be considered. This alternative continues current management direction derived from the existing field and district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to such activities as mineral leasing and development, recreation, utility corridor construction, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria for identifying site-specific use levels.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. Moreover, it did not include necessary changes to the existing decisions based on the FWS 2010 listing decision, which identified the inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative also did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B—National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the NTT Report. The GRSG NTT, comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable GRSG populations and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse MZs. The NTT Report preparers proposed conservation measures based on habitat requirements and other life history aspects of GRSG. Also they described the scientific basis for the conservation measures proposed within each program area. The NTT Report also provided a discussion of and emphasized the importance of standardizing monitoring across the WAFWA Sage-Grouse MZs.

The BLM's Washington Office IM 2012-044 directed the sub-regional planning to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMAs and would avoid development in GHMAs; it would close PHMAs to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals; and it would recommend withdrawal from locatable mineral entry in all PHMAs. These management actions would reduce surface disturbance in PHMAs and would minimize disturbance in GHMAs, thereby maintaining GRSG habitat.

Management actions for wildfire would focus on suppression in PHMAs and GHMAs, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices proposed in the NTT Report would be included as RDFs as part of Alternative B and are listed in Appendix C, Required Design Features (RDFs), of each of the attached ARMPAs.

Alternative B was not selected in its entirety as the ARMPAs because most of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMAs, and few conservation measures in the report were provided for in GHMAs. As a result, Alternative B did not provide adequate conservation in GHMAs.

3.1.3 Alternative C—Citizen Groups' Recommended Alternative One

Alternative C was based on an alternative recommended by citizen groups. This alternative emphasizes improving and protecting GRSG habitat and was applied to all occupied GRSG habitat (PHMAs and GHMAs). Alternative C limited commodity development in areas of occupied GRSG habitat and closed or excluded large portions of the Planning Area to many land uses. This included all PHMAs and GHMAs as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and nonenergy leasable mineral development, and exclusion areas for ROWs. The Utah Draft RMPA/EIS combined this alternative with Alternative F (discussed below) and included two sub-alternatives under Alternative C for a reduction in livestock grazing and WHB management.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMAs and GHMAs to such an extent that it did not adequately accommodate local needs, customs, and culture. Also, it included proposed actions that are not necessary for GRSG conservation. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required to conserve GRSG and its habitats. Alternative C was also not selected in its entirety because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D—Draft RMP Amendments' Preferred Alternative

Alternative D, which was identified as the preferred alternative in the Draft EISs, balanced opportunities to use and develop the Planning Area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while allowing for human disturbances, with stringent mitigation measures. This alternative represents the mix and variety of management actions based on the BLM's analysis and judgment, which best resolve the resource issues and management concerns, while meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMPAs/EISs, this alternative was modified to become the Proposed RMPAs and was analyzed in the Final EISs. The preferred alternatives, with slight variations, became the proposed plans in the Final EISs.

In PHMAs under Alternative D, disturbance in GRSG habitat would be limited by excluding wind and solar energy development (except for certain counties in Southeastern Oregon, where avoidance is applied), avoiding most ROW development (subject to certain conditions), applying NSO stipulations to fluid mineral development, and closing PHMAs to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMAs under Alternative D, allocations are less stringent but still aim to protect GRSG habitat (for example, applying moderate constraints and stipulations to fluid minerals in GHMAs).

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem restoration, would increase fire suppression in PHMAs and GHMAs, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative based on information provided by the State or Governor's offices for inclusion and analysis in the EISs. In many instances, the BLM had to adjust what was provided by the

States and Governors to fit such requirements as BLM language and decision-making constructs. This alternative incorporates guidance from specific State conservation strategies, if developed, or recommendations from the State for managing Federal lands. It emphasizes managing GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. Alternative E was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a State GRSG conservation plan and, under this alternative, reverted back to Alternative A, the No Action alternative.

For Nevada, Alternative E would apply an "avoid, minimize, and mitigate" strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. The effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed. This is because the State's plan does not contain land use plan-level allocation decisions, such as ROW exclusion and avoidance areas; it relies largely on the avoid, minimize, and mitigate strategy at the project level.

The FWS March 2010 "warranted, but precluded" ESA listing decision identified the inadequacy of regulatory mechanisms as a significant threat to GRSG. RMP conservation measures were identified as the BLM's principal regulatory mechanism. The BLM believes Alternative E did not incorporate adequate regulatory mechanisms into the existing plan to meet its purpose and need to conserve, enhance, and protect GRSG and its habitat; therefore, the BLM did not select Alternative E as the ARMPA.

For Oregon, Alternative E contains GRSG conservation guidelines from *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat*. This document describes the Oregon Department of Fish and Wildlife's proposed management of GRSG on Federal lands. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the State plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the State plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats, such as recreation, improper livestock grazing, and West Nile virus, for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, Alternative E1 is based on the State of Utah's *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013) and would apply to all BLM-administered lands in Utah. In Alternative E1 conservation measures would be applied to 11 State-identified areas, called Sage-Grouse Management Areas. Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on State or Federally managed lands within any particular GRSG management area; occupied habitat outside of these areas would not receive new management protection and would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected in its entirety as the ARMPAs because some components of the State's plans were not consistent with the purposes, policies, and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the alternative were carried forward.

3.1.6 Alternative F—Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMAs and GHMAs. Alternative F would limit commodity development in areas of occupied GRSG habitat and would close or designate portions of the Planning Area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMAs. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and WHB management use by 25 percent within PHMAs and GHMAs. While the Utah Draft EIS did not include an Alternative F, it did create two sub-alternatives under Alternative C for livestock grazing and WHBs to consider and analyze a similar reduction.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMAs and GHMAs to such an extent that it did not give adequate accommodation to local needs, customs, and culture.

3.1.7 Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMPAs/EISs, the BLM developed the Proposed Plan Amendments/Final EISs for managing BLM-administered lands. In these documents, the BLM focused on addressing public comments, while continuing to meet its legal and regulatory mandates.

The Proposed Plan Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the Draft EISs. The Proposed Plan Amendments, with slight variations (as outlined in **Section 2.4** of this ROD), became ARMPAs. The BLM adopted the Proposed Plan Amendments as the ARMPAs because they also balance resource protections with resource uses to protect resources, while achieving sustainable resource development.

3.1.8 Environmentally Preferable Alternative

CEQ regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2[b]). Question 6A of CEQ's *40 Most-Asked Questions* regarding CEQ's NEPA regulations (46 FR 18026) defines that term to ordinarily mean the alternative that best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs, is the most environmentally preferable. However, NEPA expresses a continuing policy of the Federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA). FLPMA requires the BLM to manage the public lands for multiple-use and sustained yield (see FLPMA Section 302.) Section 102(12) of FLPMA declares a policy of the United States that "the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands including implementation of the Mining and Minerals Policy Act of 1970 (84 Stat. 1876, 30 USC, Section 21a) as it pertains to the public lands." For these reasons, Alternative B was not selected as the sub-regional ARMPAs.

3.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations
- They did not meet the purpose and need
- The alternative was already captured within the range of alternative analyzed in the EIS
- They were already part of an existing plan, policy, or administrative function
- They did not fall within the limits of the planning criteria

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11 of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- FWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMAs or GHMAs to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMAs or GHMAs to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- FWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMAs or GHMAs to OHV Use Alternative

Utah

- FWS-Listing Alternative

- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMAs for All Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- COT Report Alternative
- BLM Policies and Regulations Alternative

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4. PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

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CHAPTER 4
PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department of the Interior policies and procedures for implementing NEPA, as well as specific BLM planning and NEPA policies. NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed management.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through *Federal Register* notices, formal and informal public meetings, individual contacts, media releases, planning bulletins, and a series of GRSG planning-related websites.

This section documents the outreach efforts that have occurred to date. For more plan-specific information related to the public involvement, consultation, and coordination processes that the BLM conducted, please refer to Chapter 3 of the attached ARMPAs.

4.1 PUBLIC INVOLVEMENT

The scoping period for the National GRSG Planning Strategy, including the four sub-regional Planning Areas in the Great Basin Region, began with the publication of the Notice of Intent in the *Federal Register* on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012 (BLM and Forest Service 2012).

Notices of Availability for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMPAs/EISs were published in the *Federal Register* on November 1, 2013. The Oregon Draft RMPA/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Draft RMPAs/EISs, Idaho and Southwestern Montana conducted seven public meetings, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMPAs/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the proposed plan amendments. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft RMPAs/EISs' comment periods. Comments on the Draft RMPAs/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the proposed plan amendments. Public comments resulted in the addition of clarifying text but did not significantly change the Proposed RMPAs.

Notices of Availability for all of the Great Basin Region GRSG Proposed RMPAs/Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-regions were released on May 29, 2015. The release of the Notices of Availability initiated a 30-day public protest period and a 60-day Governor's consistency review. Refer to **Sections 2.5** and **2.6** for a full description of the protest period and Governor's consistency review outcomes.

4.2 COOPERATING AGENCIES

A cooperating agency is any Federal, State, or local government agency or Native American tribe that enters into a formal agreement with the lead Federal agency to help develop an environmental analysis. Cooperating agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are as follows:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other Federal, State, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal MOU for the National GRSG Planning Strategy with the FWS and the Forest Service. In addition, the Great Basin sub-regions also invited local, State, other Federal, and tribal representatives to participate as cooperating agencies for these RMPAs/EISs. In total, there were 13 MOUs signed with Federal agencies, 10 signed with State agencies, 55 signed with counties, and 5 signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outline their respective roles and responsibilities in the planning and NEPA processes. (Additional information can be found in Chapter 6 of each of the Proposed Amendments/Final EISs.) These cooperating agencies divided by sub-region are provided below.

Great Basin Region-Wide

US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana

Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California

Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration

Washoe County
Washoe Tribe
White Pine County

Oregon

Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah

Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emery County
Garfield County
Grand County
Iron County
Kane County
Lincoln County (Wyoming)
Millard County
Rich County
Sanpete County
Sevier County
State of Utah (PLPCO)
State of Wyoming
Sweetwater County (Wyoming)
Sweetwater County Conservation District (Wyoming)
Tooele County
Uinta County (Wyoming)
Uintah County (Utah)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

4.3 FWS SECTION 7 CONSULTATION

Under Section 7 of the ESA, Federal agencies must consult with the FWS when any action the agency carries out, funds, or authorizes *may affect* a listed endangered or threatened species or its designated critical habitat. The four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the Final EISs. (The FWS is a cooperating agency in this planning process.) FWS staff participated in interdisciplinary team meetings and have been provided with drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the FWS, before the release of the Draft RMPAs/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan amendments "may affect" the species for which this consultation occurred.

Before the release of the Proposed Amendments/Final EISs, the BLM formally submitted the biological assessments to the FWS for review on whether the plans would affect a Federally listed, proposed, or candidate species. The FWS evaluated the biological assessments and concurred with either a "no affect" or "may effect, but will not adversely affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana; these memoranda are appendices to each of the ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the Utah prairie dog, a threatened species under the ESA. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix J).

4.4 NATIVE AMERICAN AND STATE HISTORIC PRESERVATION OFFICE CONSULTATION

In recognition of the government-to-government relationship between individual tribes and the Federal government, the BLM initiated Native American consultation in preparation of the four Great Basin sub-regional RMPAs/EISs. The BLM coordinated with Native American tribes throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments. The letters provided initial notification of the RMPAs/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation related to the planning process. Tribes have been participating in the RMPAs/EISs processes through numerous meetings and through personal BLM contacts, and in some cases, as cooperating agencies.

As part of the NEPA scoping and consultation process, the BLM notified the Idaho, Montana, Nevada, California, and Oregon State Historic Preservation Officers (SHPOs) of the opportunities to comment on the planning and NEPA documents prepared for these efforts, as they relate to historic properties in the Planning Areas and the land use plan decisions included in the ARMPAs. The BLM sought information about historic properties in consideration of land use planning decisions in accordance with the National Programmatic Agreement between the BLM, Advisory Council on Historic Preservation, National Conference of SHPOs, and the Idaho, Montana, and Oregon State Protocol Agreement between the BLM and these SHPOs. If the BLM received comments and information from SHPOs and tribes, then it considered and incorporated that information into the Proposed RMPAs/Final EISs and the ARMPAs.

The BLM has met its obligations under Section 106 of the National Historic Preservation Act, 54 USC, Section 306108, as outlined in the National Programmatic Agreement and the State protocols. The BLM will satisfy the requirements of Section 106 of the National Historic Preservation Act for future implementation-level decisions, such as project proposals, including adequate consultation with SHPOs, Tribal Historic Preservation Officers, Native American tribes, and other interested parties. This is consistent with the alternative procedures set forth in the National Programmatic Agreement and relevant State protocols or where applicable to the Section 106 regulations.

For the Utah ARMPA, the BLM completed consultation with the Utah SHPO, in accordance with the 36 CFR 800. In July 2015, the BLM submitted a formal letter, concluding that the land use plan amendments would not adversely affect cultural properties and seeking input and concurrence on those findings. The BLM received a concurrence letter from the Utah SHPO on July 30, 2015. It will satisfy the requirements of Section 106 of the National Historic Preservation Act for future implementation-level decisions, such as project proposals, including adequate consultation with SHPOs, Tribal Historic Preservation Officers, Native American tribes, and other interested parties. This is consistent with the alternative procedures set forth in the National Programmatic Agreement and relevant State protocols and programmatic agreements or where applicable the Section 106 regulations.

5. REFERENCES

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6. APPROVAL

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CHAPTER 6
APPROVAL

Land Use Plan Decisions

It is the decision of the Bureau of Land Management to approve the Great Basin Region Resource Management Plan Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana Sub-regions, as described in this Record of Decision. The Proposed Plan Amendments and related Final Environmental Impact Statements were published on May 29, 2015, in the *Federal Register* (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of the Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze
Director
Bureau of Land Management

Date

Approval

I hereby approve the land use plan decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 1610.5-2(b) and 43 CFR 4.410(a)(3), it is not subject to appeal under Department regulations at 43 CFR, Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Janice M. Schneider
Assistant Secretary
Land and Minerals Management

Date

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U.S. Department of Interior
Bureau of Land Management

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-regions (Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana)

2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Dear Reader Letter (1 page, signed by the Secretary or Assistant Secretary)

Executive Summary (1 page)

Table of Contents

1. INTRODUCTION

1.1 National Greater Sage-Grouse Planning Strategy

In March 2010, the US Fish and Wildlife Service (USFWS) published a 12-Month Finding for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A "warranted, but precluded" determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, a species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM as conservation measures in resource management plans.

In December 2011, the BLM initiated its National Greater Sage-Grouse Planning Strategy and prepared 15 environmental impact statements (EISs), with associated plan amendments and revisions. These documents provided a set of management alternatives focused on specific conservation measures across the range of the GRSG. The 15 approved land use plans and amendments address threats to GRSG identified by state fish and wildlife agencies, the BLM National Technical Team, and the USFWS in the context of its listing decision and the Conservation Objectives Team (COT) report. The COT report was prepared by wildlife biologists from state and federal agencies and provides a blueprint for the EISs. ~~Where consistent with conservation objectives, the GRSG resource management plan amendments adopt unique state and stakeholder developed approaches and priorities.~~ Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing amendments. In addition, regular meetings with the Western Governors Association Sage-Grouse Task Force provided additional opportunities for coordination with member states. Many states have developed conservation strategies or approaches for Greater Sage-Grouse management. Where such State strategies or approaches were completed, the BLM and USFS made every effort to incorporate them or develop complementary strategies and approaches, consistent with achieving long-term conservation of Greater Sage Grouse and taking a landscape approach to conservation. While most major decisions across the plans are the same, as a result of incorporating state-specific approaches at the subregional planning level, there are some differences in the approaches taken in each plan. Each of the subregional plans, and the plans cumulatively, achieve the overarching goal of protection of Greater Sage-Grouse and its habitat. The different state-specific approaches taken in each plan are further described in section xxx.

Comment [KK1]: Probably a little more detail on COT & how it was used to formulate the approved plan??

[Per Sarah Greenberger's recommendation, we need to discuss further the desire to incorporate state developed approaches and priorities balanced with the need for an effective conservation strategy

(reference to the Salazar invitation). We also need to capture some of the major differences between the plans and why those differences exist.]

1.2 Great Basin Region Planning Area

The Great Basin Region is composed of WAFWA Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin). The USFWS has identified a number of threats in this region, including wildfire, loss of native habitat to invasive species, and habitat fragmentation. Great Basin regions are further divided into sub-regions; this National Environmental Policy Act (NEPA) analysis is being conducted on the sub-region level. These sub-regions are generally based on the identified threats to the GRSG and the WAFWA Management Zones.

[Insert discussion of the Great Basin Region Planning Area and threats present and widespread in the region. Work with NOC to produce map of the Great Basin Region, depicting sub-regional boundaries. (1 page)]

1.3 Great Basin Region Greater Sage-Grouse Conservation Summary

[Focus the discussion on the 5 factor analysis made in the USFWS listing determination and how the plans cumulatively address the factors presented in the 2010 listing decision. This is how section IV of the Landscape Report was formulated. (1-2 page)]

Comment [KK2]: This could probably be a shortened version of the summary that Jim is developing for the landscape report. Is this the place to provide rationale for the differences between the plans & why they collectively meet the conservation need?

2. DECISION

2.1 Summary of the Approved Management Decisions

[This is the primary decision - to approve the attached ARMPA. (1 paragraph)]

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

[Briefly discuss the types of decisions that are presented in the approved RMPAs, such as the goals, objectives, and management actions to conserve GRSG habitat. (1 paragraph)]

Comment [KK3]: Do we need to explain the differences in plans here? Also provide rationale for the plan we chose?

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

[Briefly discuss the types of decisions that are not presented in the approved RMPAs (no decisions outside of BLM's jurisdiction for example) and that the plans do not include implementation or site specific decisions. (1-2 paragraphs)]

Comment [KK4]: This is a bit of a challenge in my mind, because certainly how we are going to prioritize work on grazing allotments is not a RMP decision (I would argue its not even an implementation decision – its actually an administrative action that does not require NEPA).

2.5 Modifications and Clarifications

2.5.1 Modifications and Clarifications

[Briefly discuss the minor changes that were made from the release of the PRMPs to now (preparation of the ARMPAs and Greater Sage-Grouse Habitat RMP decisions from the revisions) to clarify the decisions, to better reflect existing policies, and to correct errors brought to our attention. (1 page)]

2.5.2 Protest Resolution

[Overview of the parties that protested on the PRMPAs/FEISs, what their issues were, and how BLM responded to them (were granted and/or dismissed). (1 page)]

2.5.3 Governors Consistency Review

[Brief overview of the GCR process, if/how the BLM modified the ARMPAs based on the Governor's recommendations or a description as to why the BLM dismissed the Governor's recommendations (1 page)].

3. ALTERNATIVES CONSIDERED

3.1 No Action Alternative

[A paragraph that describes the current management alternative (1 paragraph).]

3.2 Environmentally Preferred Alternatives Considered in all Sub-Regions

[Include a paragraph describing the NTT and citizen based alternatives that were considered across all four sub-regions, and provide rationale as to why they were not selected as the ARMPA. (2 paragraphs)]

Comment [KK5]: All of them? Are they all environmentally preferred?

3.3 Alternatives Considered and Specific to Individual Separate Sub-regions

[This section would include four sub-sections for each plan and will include separate paragraphs (extracted from the executive summaries from the FEISs) for each of the unique alternatives considered for each sub-region). (1 page)]

Comment [KK6]: If we keep this high-level, we should only need subsections for the "extra" alternatives I would think – it seems like the set of alternatives in all plans were pretty standardized.

4. MANAGEMENT CONSIDERATIONS

[Identify and discuss all such factors including any essential considerations of national policy which were balanced by the DOI in making its decision to approve the ARMPAs and state how those considerations entered into its decision. (1/2 page)]

Comment [KK7]: I'm not sure I understand what goes here, can we get an example?

5. MITIGATION MEASURES

All practical means to avoid or minimize environmental harm are encompassed in the attached Approved Resource Management Plan Amendments and associated appendices. Mitigation measures, including the application of required design features have been identified.

[Summarize the additional mitigation framework commitments being made as part of this planning effort. (1 paragraph)]

6. PLAN MONITORING

[Summarize the monitoring strategy, emphasizing the process for effectiveness and implementation monitoring. (1-2 paragraphs)]

7. CONSULTATION AND COORDINATION

[Initiate section with the national level cooperators (Forest Service and FWS) and then include subsections for each of the 4 ARMPAs to talk about cooperating agencies, Section 7 consultation, and tribal consultation. (1-2 pages)]

Comment [KK8]: Does this really need to be this long, can't we talk in generalities & reference the ARMP or PRMP/FEIS for more details?

8. APPROVAL

Bureau of Land Management Director Recommendation

I recommend adoption of the National Greater Sage-grouse Conservation Strategy – Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. The final EISs have considered all valid issues raised during scoping and address all relevant comments raised on review of the draft RMPs and amendments, and their associated EISs. All planning protests filed with the Director under administrative review procedures in 43 CFR 1610.5-2 have been resolved. No inconsistencies were identified after review by the Governors of Nevada, California, Oregon, Utah, Idaho, and Montana as provided by 43 CFR 1610.3.2. The Approved Resource Management Plans and Amendments represent the agencies' appropriate conservation measures to conserve, enhance and/or restore Greater Sage-Grouse ~~habitat~~ by reducing, eliminating, or minimizing threats to Greater Sage-Grouse habitat.

Neil Kornze, BLM Director | Date

Department of Interior Approval

I concur with the decisions in the National Greater Sage-grouse Conservation Strategy – Great Basin Region Approved Resource Management (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub regions, as described in this Record of Decision.

Sally Jewell, Secretary of Interior | Date

9. ATTACHMENTS

Appendix A. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Comment [KK9]: What is this?

Appendix B. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix C. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Internal Draft Document – Do Not Distribute

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana; Nevada and Northeastern California; Oregon; and Utah

Prepared by:

U.S. Department of Interior
Bureau of Land Management
Washington, DC

August 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Cooperating Agencies

Great Basin Region-Wide

US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana

Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California

Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon

Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah

Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emory County
Garfield County
Grand County
Iron County
Kane County
Lincoln County
Miller County
Piute County
Rich County
San Pete County
Sevier County
State of Utah (PLPCO)
Sweetwater County
Sweetwater County Conservation District
Tooele County
Uinta County (UT and WY)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

[Insert BLM WO Letterhead]

In Reply Refer To:
In Reply, Refer to:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah,). The ROD approves the four Great Basin Region ARMPAs, which are part of fifteen other sub-regional RMP Amendments and RMP revisions associated with the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011.

The Bureau of Land Management (BLM) ARMPAs provide a range wide, comprehensive, science-based, collaborative strategy for addressing previously identified threats to the Greater Sage-Grouse (GRSG). This strategy, while designed to address issues leading to the 2010 “warranted but precluded” decision by the U.S. Fish and Wildlife Service (FWS), was guided by over a decade of research, analysis and recommendations for GRSG conservation produced by the Conservation Objectives Team (COT), Western Association of Fish and Wildlife Agencies (WAFWA), the BLM National Technical Team and (NTT). Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and local partners were fundamental during the development of the land use plan decisions within these ARMPAs to address the identified threats to GRSG.

It is important to note that this ROD and these ARMPAs are specific only to BLM administered lands. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft EISs and Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy Management Act (FLPMA) requires the development and maintenance, and, as appropriate, the revision of land use plans for public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions that could significantly affect the environment. In fulfillment of these requirements, the Draft RMP Amendments/Draft EISs incorporating analysis and input provided by the public; local, State, and

other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM personnel were published in the fall of 2013. The 90-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 letters that were submitted. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

The Proposed RMP Amendments/Final EISs were made available on May 29, 2015, for a 30-day protest period. X protest letters were received, of which X were valid protests in need of resolution. Protest issues are addressed and resolved in the Protest Summary Report, available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

After much consideration, the BLM now approves the Proposed RMP Amendments as the land use planning documents that will guide Greater Sage-Grouse habitat management in the Great Basin Region for the life of the plan amendment.

Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, Cooperating Agencies; local, State, and other Federal agencies; and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented and monitored for the conservation of Greater Sage-Grouse and their habitat.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This~~e~~ Record of Decision (ROD) is the culmination of an unprecedented effort in public land management to meet the multiple-use and sustained-yield management objectives for public lands administered by the Bureau of Land Management (BLM) in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA). ~~directs the United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) to develop and periodically revise or amend its resource management plans (RMPs), which guide management of BLM-administered lands.~~

In response to a 2010 determination by the U.S. Fish and Wildlife Service (FWS) that the greater sage-grouse listing under the Endangered Species Act (ESA) is "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service) has developed a targeted, multi-tiered, landscape-level management approach, based on the best available science, that offers the highest level of protection for GRSG in the most important habitat areas to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team (COT) report.

This~~e~~ Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs)~~ROD and ARMPAs~~ for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon; and Utah ~~provides a layered management approach that offers the highest level of protection for Greater Sage-Grouse in the most valuable habitat to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team report.~~ includes ~~L~~land use allocations in the ARMPAs that would limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs would implement a suite of management ~~tools~~ actions, such as the establishment of disturbance limits, GRSG habitat objectives, ~~and monitoring~~, mitigation requirements~~approaches~~, monitoring protocols, and adaptive

Comment [JRL1]: The are not tools, but management actions to be implemented by the plans. DDCT is a tool, but establishing disturbance limits is a management action management triggers and responses, as well as~~nd~~ other conservation ~~protective~~ measures throughout the range. ~~These overlapping and reinforcing~~ The cumulative effect of these conservation measures would work in concert to protect, improve, and restore GRSG habitat ~~condition~~ across the remaining range of the species in the Great Basin and provide ~~consistency in~~ greater certainty that~~how the~~ BLM land and resource management ~~manages~~ activities in GRSG habitat in the Great Basin Region can lead to conservation of the GRSG and other sage steppe associated species in the region.

In conjunction with the management actions for GRSG included in the ROD and ARMPAs and ARMPRs for the Rocky Mountain GRSG subregion, this ROD and ARMPAs for the Great Basin subregion provides management direction to protect and restore habitat essential to the conservation of the GRSG across its remaining range. This conservation strategy, developed in collaboration with the 11 states in which the ARMPAs and ARMPRs apply, in addition to other state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna, in order to "conserve the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT report. 2014]

Comment [JRL2]: This is the suite of actions facilitated by the plans

Comment [JRL3]: Certainty is better than "consistency" as that has become a "trigger" for negative response

Comment [JRL4]: Tie to ultimate goal and to benefit to other species and the ecosystem overall.

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Table of Contents

Summary

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

1.1 Threats to Greater Sage-Grouse

Currently, Greater sage-grouse occupy an~~d~~ area that has been estimated to be a reduction of 44% from the historically occupied range. In addition, populations in most or the range have been demonstrated to have declined from 1965- 2003, the period where data was collected most intensively.

The decline of the greater sage-grouse (GRSG) and its sagebrush steppe habitat has been the focus of fish and wildlife agency and conservationists' concerns for decades. In 1954 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of sage-grouse. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of sage-grouse population losses and degradation of sagebrush ecosystems in order to: *1) Maintain the present distribution of sage grouse and 2) Maintain the present abundance of sage-grouse.* In 1999 WAFWA amended the objectives to: *1) Maintain and increase where possible the present distribution of sage grouse and 2) Maintain and increase where possible the present abundance of sage grouse.* The Bureau of Land Management, USFWS, and U.S. Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000.

Between May 1999 and December 2003, eight petitions were filed with the U.S. Fish and Wildlife Service (USFWS) to have sage-grouse protected under provisions of the Endangered Species Act (ESA). In 2001 the USFWS determined that greater sage-grouse in the Columbia Basin of Washington state warranted protection under provisions of the ESA. On January 12, 2005, the FWS issued a decision that listing the GRSG for protection under the ESA was not warranted. However, in response to July 14, 2006 Western Watersheds Project filing alleging that the FWS 2005 finding was incorrect and arbitrary, the U.S. District Court of Idaho ruled that the 2005 finding was "arbitrary and capricious" and remanded it to the FWS for further consideration. Ultimately, as a result, in 2010 the FWS issued a finding that listing of the Greater sage-grouse was "warranted but precluded". Subsequent to that finding, and in accordance with a settlement agreement [details?] the FWS committed to make a final determination regarding the need to list the GRSG by September 30, 2015. Two factors led to the FWS decision to list the species as "warranted but precluded": threats to habitat and the inadequacy of existing regulatory mechanisms.

Primary threats affecting GRSG habitat on Forest Service and BLM-administered lands include infrastructure (power lines, communication towers, fences, roads, and railroads), and energy development (traditional oil and gas, mining, renewable energy, transmission corridors) within WAFWA GRSG Management Zone I, II and VII; and Fire, Invasive Weeds, and Pinyon-Juniper Encroachment within WAFWA GRSG Management Zone III, IV, V and VI. Improper grazing (livestock and wild horse) and climate change may be a threat across all management zones, and all threats exist to some degree across the range of the species. *Differences in ecological conditions within each MZ affect the susceptibility of these areas to the various threats facing* *sagebrush ecosystems and its potential for restoration. (FWS FRN 2010).* (See reference to WAFWA Management Zones (MZ) below.)

Additional information regarding potential threats to the GRSG is contained in the BLM National Technical Team (NTT) report and the Conservation Objectives Team (COT) reports. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG – as articulated in the COT report – is summarized in Table X [Include from Final Landscape report.]

In addition, the Service found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM and the Forest Service, which manage more than 50 of the remaining habitat rangewide, regulatory mechanisms are the agencies' Resource Management Plans and Land Resource Management Plans, respectively.

The Federal Land Policy and Management Act of 1976 (FLPMA) is the primary Federal law governing most land uses on BLM-administered lands, and directs development and implementation of Resource Management Plans (RMPs) [1] which direct management at a local level. As a designated sensitive species under BLM Manual 6840, GRSG conservation must be addressed in the development and implementation of RMPs on BLM lands. RMPs are the basis for all actions and authorizations involving BLM administered lands and resources. They authorize and establish allowable resource uses, resource condition goals and objectives to be attained, program constraints, general management practices needed to attain the goals and objectives, general implementation sequences, intervals and standards for monitoring and evaluating RMPs to determine effectiveness, and the need for amendment or revision (43 CFR 1601.0-5(k)).

Management of activities on National Forest System lands are guided principally by the National Forest Management Act (NFMA) (16 U.S.C. 1600-1614, August 17, 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, 1988, and 1990). NFMA specifies that the Forest Service must have a Land and Resource Management Plan (LRMP)[1] (16 U.S.C. 1604) to guide and set standards for all natural resource management activities on each National Forest or National Grassland. All of the LRMPs that currently guide the management of GRSG habitats on Forest Service lands were developed using the 1982 implementing regulations for land and resource management planning (1982 Rule, 36 CFR 219).

This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other

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[1] Throughout this report, BLM Resource Management Plans (RMPs) and Forest Service Land and Resource Management Plans (LRMPs) will simply be referred to as Land Use Plans or LUPs.

applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft EISs and Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and associated Land and Resource Management Plans under their planning authorities.

1.2~~1~~ National Greater Sage-Grouse Planning Strategy

The BLM and the Forest Service collectively manage the majority of the GRSG habitat (i.e., the range of GRSG not including the Columbia Basin or Bi-State Distinct Population Segments) addressed in this planning effort. Efforts to conserve the habitat of this species did not begin with the 2011 BLM/ Forest Service Planning Strategy, but rather, have been ongoing for many years.

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The Western Association of Fish and Wildlife Agencies (WAFWA) 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, contributed to by the BLM and the Forest Service, was to present an unbiased and scientific documentation of dominant issues and their effects on GRSG populations and sagebrush habitats. http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

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In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the U.S. Fish and Wildlife Service (FWS), the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG. The WAFWA Sage-Grouse Management Zones were delineated in this Strategy. http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

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Comment [JRL5]: Link later if decide to use WAFWA zones to frame strategy

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In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation as well as summarizing BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States and Canada. http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, BLM commissioned an effort to map breeding densities of GRSG across the West. A conference was convened with the state wildlife agencies to get approval and to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active leks across the West. This model served as a standard starting point for all states to identify priority habitat.
http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published their 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the~~a~~ species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM and Forest Service as conservation measures in land use plans.

~~Consistent with the National GRSG Planning Strategy, the BLM as the lead agency, together with the U.S. Forest Service as a cooperating agency, prepared 15 environmental impact statements (EISs), with associated plan amendments and revisions. These documents provide a set of management alternatives focused on specific conservation measures across the range of the GRSG (see **Figure X**, National Greater Sage-Grouse Planning Strategy Boundaries) to address the threats identified in the 2010 USFWS "warranted but precluded" decision. .~~

~~*[Insert Figure X here.]*~~

~~Science-based decision-making and collaboration with state and local partners were fundamental to the National GRSG Planning Strategy. The 17 ARMPAs and ARMPs address threats to GRSG identified by state fish and wildlife agencies, the BLM National Technical Team (NTT), and the USFWS in the context of its listing decision and the Conservation Objectives Team (COT) report.~~

[Insert Figure X here.]

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Comment [JRL6]: CAPs or lower case?

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Comment [JRL7]: If we reference a specific "Strategy", we need to explain its genesis. Should we use lower case instead or provide additional history. Former would be simpler.

Comment [JRL8]: 17?

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Comment [JRL9]: The COT had not been published prior to completion of the draft EISs.

The GRSG National Technical Team (NTT), comprised of BLM, ~~Forest Service,~~ FWS, USGS, NRCS, and State specialists, completed A Report on National Greater Sage-Grouse Conservation Measures in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized importance on standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

Beginning in XXXX [date(s)] and consistent with the National GRSG Planning Strategy, the BLM as the lead agency, together with the U.S. Forest Service as a cooperating agency, developed 15 environmental impact statements (EISs), with associated plan amendments and revisions. The draft EISs displayed a set of management alternatives focused on specific conservation measures (see **Figure X**, National Greater Sage-Grouse Planning Strategy Boundaries) to address the threats identified in the 2010 USFWS "warranted but precluded" decision as well as GRSG management recommendations included in the BLM National Technical Team (NTT) report.

In 2012, FWS convened the~~a~~ Conservation Objectives Team (COT) of state and federal representatives to produce a peer-reviewed report ~~recommendation regarding~~ which identified the principal threats to GRSG survival -- based upon the FWS 2010 listing decision -- and the degree to which these threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. ~~The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations.~~ (See Figure A and Table A.) The COT report also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the ARMPAs.

The BLM also adopted unique state and stakeholder developed approaches and priorities within the ARMPAs. In 2011, then Secretary of the Interior Ken Salazar sent letters to each of the sage-grouse state governors asking for a report and recommendations on how to best move forward with a multi-state conservation sage-grouse plan. Most states across the range provided recommendations for the management of the BLM lands in their state to conserve sage grouse. In all cases, this input was incorporated into ~~state conservation plans that were part of~~ the range of alternatives analyzed in the Final EISs. Components of these state recommendations~~conservation plans~~ were used to develop the ARMPAs.

In addition, the Western Governors Association Sage Grouse Task Force was established in 2011 to identify and ~~implement~~ recommend ~~high priority~~ state and federal conservation actions ~~and integrate ongoing actions~~ necessary to preclude the need for the GRSG to be listed under the ESA. This group, which includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, US Forest Service, US Geological Survey, and the Department of the Interior, played an integral role throughout this land use planning process.

Comment [JRL10]: Forest Service was not a part of the NTT.

Comment [JRL11]: SUGGEST INCLUSION OF FIGURE ILLUSTRATING WAFWA ZONES.

Comment [JRL12]: CAPs or lower case?

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Comment [JRL13]: Was not a recommendation

Comment [JRL14]: Suggest including table with list of threats from COT report.

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Comment [JRL15]: Is this correct? Haven't seen this letter.

Comment [JRL16]: Confusing to refer to state recommendations for managing BLM land in a state as "state plans". Suggest this alternative. Most readers would think of state plans as state plans to manage lands within their jurisdiction.

Comment [JRL17]: SGTF did not implement

1.3~~2~~ Address~~Ameliorat~~ing Threats to the Greater Sage-Grouse ~~through the National Greater Sage-Grouse Planning Strategy~~

~~*[Need to verify with Jim and Karen what elements from the Landscape Report they would like to see here. Right now, we only included content from Section VII (Summary) of the Landscape Report, but we can change this if needed. We can even include some of the pie charts and figures from the LR if necessary.]*~~

The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to "maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations".[2] The NTT report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed"[3] And, in establishing the COT, with the backing of the SGTF, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006 WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following,

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> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."

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The four Great Basin ARMPAs addressed by this ROD and the 13 ARMPAs/ARMPs in the Rocky Mountain Region subregion are the result ~~product~~ of the National GRSG Planning Strategy~~, the four Great Basin ARMPAs~~ and ~~13 ARMPAs/ARMPs in the Rocky Mountain Region,~~ were developed to remove or reduce identified threats to the species and are an essential component of the effort to conserve GRSG and obviate a listing of the species under ESA. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain updated land use plan direction on nearly 60 percent of the remaining habitat for the species. These ARMPAs/ARMPs are the product of extensive coordination between the BLM and the Forest Service and~~, including t~~ the active engagement of the USFWS in helping to inform land allocation and related management decisions by the BLM and Forest Service. The plans~~y~~ also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, and circumstances in each.

~~This section highlights the m~~Major components of the ~~that are presented in the~~ attached ARMPAs ~~that~~ developed ~~were constructed~~ to address the specific threats to the viability of the GRSG, as identified in the USFWS 2010 listing decision and COT Report (many of which were also identified by the BLM's NTT Report) are summarized below.

~~*Land Allocations*~~

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[2] WAFWA 2006 Strategy. The 2006 objectives built on an initial framework and commitment made by the WAFWA directors, the BLM and the FWS in 2000 with the signing of an interagency sagebrush/sage-grouse conservation MOU.

[3] Sage-grouse National Technical Team. "A Report on National Greater Sage-Grouse Conservation Measures". December 21, 2011.

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized ~~recommended~~ an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

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To adequately address the reasons for the 2010 "warranted" determination by the FWS – and specific threats summarized in the COT report -- it was clear to BLM and Forest Service land and resource managers that additional regulatory measures on federal public lands would be necessary to deal with present or threatened destruction, modification, or curtailment of habitat or range. These measures would need to be incorporated into land use plans that guide management actions on lands within the remaining range of the GRSG administered by the agencies to conserve GRSG such that listing under the ESA was no longer necessary.

In December 2011, the BLM and the Forest Service published a Notice of Intent to prepare Environmental Impact Statements and Supplemental Environmental Impact Statements to incorporate GRSG Conservation Measures into Land Use Plans and Land and Resource Management Plans across the range of the species. A total of 15 subregional LUPs would amend or revise 78 BLM RMPs and 20 Forest LRMPs across the range of the species.

The federal public land conservation strategy reflects several key concepts:

- **Landscape-level**: The planning effort focuses on the remaining habitat of the GRSG on BLM and Forest Service lands, covering 10 western states in the Great Basin and Rocky Mountain regions.
- **Best Available Science** – The proposed LUPs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat and the NTT report, prepared by the BLM, provided options for dealing with the most significant threats to the GRSG. A series of reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the Western Association of Fish and Wildlife Agencies also provided crucial guidance in formulating the conservation strategy.
- **Targeted, Multi-Tiered Approach** – The proposed LUPs were designed to incorporate a layered management approach to avoid or minimize additional surface disturbance in the most valuable habitat, known as Priority Habitat Management Areas (PHMA), which are largely consistent with PACs identified in the COT Report. Within PHMA, the proposed LUPs provide an added level of protection to limit or eliminate new surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. In General Habitat Management Areas (GHMA), the proposed LUPs seek to minimize disturbance while providing greater flexibility for land use activities.

- **Coordinated**: The BLM and Forest Service proposed LUPs were developed through a joint planning process led by the BLM with the Forest Service as partners. The USFWS provided guidance and input throughout the process to aid land managers in understanding the threats and the certainty and effectiveness of proposed land management actions in addressing those threats. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative**: The proposed LUPs reflected the input of states and local stakeholders from the outset and were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Sage Grouse Task Force (SGTF) was particularly useful in facilitating this kind of collaborative input. The proposed LUPs reflect state and stakeholder developed approaches and economic priorities where consistent with conservation objectives.

Conservation Measures for Habitat Protection, Restoration, and Improvement

Land Allocations

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In order to protect the most important GRSG habitat areas, the conservation strategy began with mapping areas of important habitat across the remaining range of the GRSG and within each state. In collaboration with state fish and wildlife agencies, the BLM and Forest Service identified areas as preliminary priority habitat (PPH) and preliminary general habitat (PGH). Maps were revised and refined as further mapping was conducted and state fish and wildlife agencies – often in collaboration with GRSG experts and researchers – provided more detailed analysis of habitat characteristics and populations. The proposed LUPs reflect this input. Priority Habitat Management Areas (PHMAs) largely coincide with identified Priority Areas for Conservation (PACs) in the COT Report. Final general habitat areas are identified as General Habitat Management Areas (GHMAs). Some states developed additional habitat categories which can be found in specific state plans.

The proposed LUPs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memo from FWS Director Ashe to BLM Director Kornze and Forest Service Chief Tidwell in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection"[4] (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf)

The SFAs reflect a subset of these strongholds, since the FWS map included areas that are not administered by the BLM or Forest Service or were outside the planning area. The FWS memo advised that "[s]trong, durable, and meaningful protection of federally administered lands in these areas will provide additional certainty and help obtain confidence for long term sage grouse

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[4] Memorandum from Dan Ashe to Director, BLM and Chief, USFS, "Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes. October 27, 2014.

persistence." The BLM and Forest Service proposed LUPs mapped approximately 66 million acres of PHMA and GHMA. Of this, approximately 35 million acres are identified as PHMA and 31 million acres are GHMA. SFAs consist of 11 million acres of BLM and Forest Service-administered lands in PHMAs. (See Figure B.)

This tiered habitat framework provides for a nested or layered conservation design with the greatest protections and limited new surface disturbance in SFAs, a high degree of certainty that the integrity of PHMAs can be maintained through land allocations to avoid or minimize additional surface disturbance, and protection of remaining habitats in GHMAs, with more flexibility for land use activities that would be designed to minimize impacts on existing GRSG leks. In all GRSG habitat areas, anthropogenic surface disturbing activities would be mitigated and, fire-impacted landscapes would be actively restored and protected with a priority on SFAs, then PHMAs, and GHMAs.

To avoid or minimize further surface disturbance in PHMAs the proposed LUPs either exclude or avoid major new surface disturbing activities. In SFAs, in addition to PHMA decisions, proposed LUPs also apply a no surface occupancy stipulation with no exceptions for oil and gas leasing and recommend these areas for withdrawal from future locatable mineral entry. To further protect and enhance habitat in SFAs and PHMAs, the BLM and Forest Service will prioritize rangeland fire management (either through appropriate pre-suppression activities, suppression or post-fire restoration), gathers of wild horses and burros, and review of grazing permits for compliance with land health standards, vegetative objectives and permit terms and conditions that incorporate GRSG habitat management objectives in these areas.

The combination of habitat classifications and land allocation decisions proposed for inclusion in the proposed LUPs will provide the greatest protection for those areas identified as SFAs and meet the stated objective for these areas "where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species"[5] and target habitat protection and restoration activities to those areas of highest importance. The proposed LUPs also largely avoid or exclude major development in PHMAs, in areas without an implemented all lands regulatory approach,[6] through avoidance for transmission, and exclusion for other major surface disturbing activities (e.g., solar and wind energy development).

In response, the four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA included the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil, gas, and geothermal reserves in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region. To benefit GRSG conservation efforts and to assist developers in reducing the time and cost

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[5] USFWS memorandum. Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes. October 27, 2014.

[6] An all lands regulatory approach refers to a management strategy in which certain activities likely to affect the conservation of GRSG, including activities on state and private lands, are regulated, such as through the Wyoming Greater Sage Grouse Conservation Plan, Greater Sage Grouse Core Area Protection Executive Order.

associated with oil and gas leasing development, the BLM will prioritize new leasing in areas outside of PHMAs and GHMAs.

Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in PHMAs for non-energy leasable minerals and saleable minerals. An exception is granted for free use permits and the expansion of existing active pits for mineral material sales and expansion of existing non-energy leasable development. There is no potential for coal development in the Great Basin outside of Utah. In Utah, at the time of a new coal lease or lease modification, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are “essential habitat” for purposes of suitability determinations.

In all PHMA in the Great Basin Region, new rights of way and development for transmission lines, pipelines, and related infrastructure will be avoided through restrictions on land use authorizations. Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat.

Comment [JRL18]: I don’t recall this exception.

Renewable energy development (solar and wind) is excluded in PHMAs in the four Great Basin ARMPAs, with the exception of three counties in southeastern Oregon where an avoidance allocation is applied.

In general, all forms of new development would be excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat. This is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*, published by the FWS in September 2014, which states that mitigation “be strategically designed to result in net overall positive outcomes for sage-grouse.” In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation gain for the GRSG.

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~~In response, the four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA included the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil, gas, and geothermal reserves in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region. To benefit GRSG conservation efforts and to assist developers in reducing the time and cost associated with oil and gas leasing development, the BLM will encourage new leasing in areas outside of PHMAs, and GHMAs.~~

~~Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in PHMAs for non-energy leasable minerals and saleable minerals. An exception is granted for free use permits and the expansion of existing active pits for mineral material sales and expansion of existing non-energy leasable development. There is no potential for coal development in the Great Basin outside of Utah. In Utah, at the time of a new coal lease or lease modification, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are “essential habitat” for purposes of suitability determinations.~~

~~In all PHMA in the Great Basin Region, new rights of way and development for transmission lines, pipelines, and related infrastructure will be avoided through restrictions on land use authorizations.~~

~~Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless necessary for health and safety purposes.~~

Comment [JRL19]: I don't recall this exception.

~~Renewable energy development (solar and wind) is excluded in PHMAs in the four Great Basin ARMPAs, with the exception of a few counties in southeastern Oregon where an avoidance allocation is applied.~~

~~In general, all forms of new development would be excluded, avoided, or developed only if the resultant effect is a net conservation benefit to the GRSG or its habitat. In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation benefit for the GRSG.~~

While ~~the majority of compelling~~ restrictions on future development in PHMA are intended to avoid oir minimize additional surface disturbance, ~~are placed in PHMA,~~ restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation. However, any disturbance is subject to mitigation and should seek to first avoid and then minimize any impacts to GRSG or its habitat, while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species. As noted in the COT report, " … Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal , state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

In addition, the ARMPAs direct the BLM to prioritize oil and gas leasing and development outside of identified SFAs, PHMAs, and GHMAs in order to encourage new development in areas that would not conflict with GRSG and thus maximize the potential to limit disturbance to remaining GRSG habitat.

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~~An added element of habitat protection was provided for GRSG strongholds in the ARMPAs by identifying Sagebrush Focal Areas (SFAs), a subset of PHMAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memo from FWS Director Ashe to BLM Director Kornze and Forest Service Chief Tidwell in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection"(http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf). Beyond that in PHMA, management decisions to be applied to SFAs include NSO stipulation with no exceptions for oil, gas, and geothermal development; recommendation that these areas be withdrawn by the Secretary from mineral entry under the 1872 Mining Act, and prioritizing grazing permit renewal, wildhorse and burro management, and vegetation management. While the SFAs have minimal land surface disturbance and, based on existing, available data, limited mineral potential, valid existing rights – as in all habitat – will be recognized and be able to proceed in accordance with their legal rights.~~

~~*Management Direction, Prioritization, and Mitigation*~~

In addition to land allocations to protect SFAs, PHMAs, and GHMAs, the ARMPAs guide other uses of these landscapes to meet COT objectives consistent with existing, authorized uses of GRSG habitats and the sagebrush landscape.

Grazing is the most widespread use of the sagebrush steppe ecosystem in the Great Basin states. The COT Report recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the four Great Basin ARMPAs require the incorporation of GRSG seasonal habitat objectives into grazing permits, consistent with the ecological site potential of the local areas. [Incorporate additional measures for veg objectives]

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The BLM will prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts – placing emphasis on addressing conflicts with WHBs in SFAs, PHMAs, and GHMAs. In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. The BLM will develop or amend herd management area plans to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFAs and PHMAs.

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The BLM will focus on maintaining HMAs in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives and consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat. When conducting NEPA analysis for WHB management activities, water developments, or other rangeland improvements for WHB, the BLM will address the direct and indirect effects to GRSG populations and habitat. The BLM will coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program.

~~The Great Basin ARMPAs place a priority on completing land heath assessments in SFAs, then PHMAs and GHMAs. The assessments will evaluate if grazing standards and guidelines are met, ensure that GRSG seasonal habitat objectives are also being met or are making progress towards being met, and ensure that the GRSG seasonal habitat objectives are incorporated into grazing permits.~~

~~Direction in the ARAMPs also incorporates GRSG seasonal habitat objectives into establishment of allowable management levels (AMLs). Prioritization of horse gathers and removal to reach AMLs in SFAs, PHMAs, and GHMAs (in that order) will be conducted.~~

Through required design features, buffers, and other management actions, proposed LUPs allow range developments which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. The NV/CA and OR proposed LUP removes livestock ponds built in perennial channels that are negatively impacting riparian habitats and do not permit new ones to be built in these areas subject to valid existing rights.

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Management actions and required design features will ensure that the impact of fences on GRSG is minimized. Methods to be applied include marking fences in high-risk areas for collision and locating fences to limit or eliminate the impact on GRSG.

~~Fire represents the greatest threat to sage-grouse habitat in the Great Basin Region. Recognizing the nature and extent of this threat, the ARMPAs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire. The four ARMPAs include specific guidance for fire prevention and the restoration of lands impacted by fire. The Great Basin ARMPAs also provide for a more aggressive, targeted effort to prevent and suppress fires that could impact thousands of acres of sage-grouse habitat, as well as restore areas with high potential to survive the impacts of climate change and subsequent rangeland fires.~~

To ameliorate the threat from recreational activities, new facilities or expansion of existing facilities (e.g., roads, trails, campgrounds) will not be authorized on BLM-administered and National Forest System land unless the development results in a net conservation gain to GRSG its habitat. During renewal, amendment, or reauthorization, terms and conditions in existing permits and operating plans will be modified to protect and/or restore GRSG habitat.

In PHMA and GHMA (except only in PHMA in Northwest Colorado), travel would be limited to vehicle routes. Initially, vehicles would be limited to existing routes until implementation travel management planning could be completed to designate routes; on Forest Service lands travel is limited to the Forest Service travel management system. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning process.

To ameliorate the threat from new land authorizations for infrastructure, the proposed LUPs provide that major pipeline and transmission line development will be avoided in all GRSG habitats through restrictions on land use authorizations(except in GHMA in Wyoming, Utah and Idaho). Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated.

GHMA in Wyoming, Utah and Idaho would be available to rights-of-way for infrastructure due to the extent and quality of the habitat as well as the percentage of GRSG contained in PHMA in those states. An additional consideration in Wyoming is the extent of the protections for GRSG on private and state land. These factors gave BLM confidence, after input from FWS, that conservation objectives can be met with this additional flexibility provided in GHMA.

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Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of three priority lines has been underway for a number of years. These lines are critical to expanding access to renewable sources of energy and to improving the reliability of the Western grid. For these reasons, planning for these lines will proceed and potential impacts to GRSG will be fully mitigated through the mitigation identified in the site-specific NEPA for those projects.

To ameliorate the threat from fire, the proposed LUPs seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used unless necessary to facilitate site preparation for restoration of GRSG habitat. If prescribed fire is used to facilitate site preparation for restoration the associated NEPA analysis must identify how the project would move towards GRSG desired conditions, why alternative techniques were not selected, and how potential threats to GRSG habitat would be minimized.

Through both the proposed LUPs and the final report to the Secretary on an Integrated Rangeland Fire Management Strategy[7](see section VI for more information), changes in land management practices and fire management policies and practices to prevention, suppression, and restoration landscapes impacted by fire have been adopted. Section VI further details the activities and actions that the BLM and the Forest Service will conduct to ameliorate the threat to GRSG and its habitat from rangeland fire. The BLM/Forest Service are involved in several west-wide efforts with other Federal, state, and private partners to address the threat of rangeland fire.

In addition, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department".** (emphasis added) The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes in areas identified by the Fire and Invasives Assessment Tool (FIAT) in priority habitat, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT process, applying recent science, identified highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rural Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

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A related concern is conservation strategies to limit the spread of cheatgrass in the Great Basin, which negatively affects the establishment of native grasses and sage-steppe vegetation and increases the risk of rangeland fire. To respond, all proposed Great Basin subregion ARMPAs include the following vegetation objective: *In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with at least 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).*[8]

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Through guidance in the proposed ARMPAs supplemented by the Integrated Rangeland Fire Management Strategy, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.

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[7] *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary*. Department of the Interior. May 1, 2015.

~~Lek protection~~

In addition to land allocations and management actions included in the Great Basin ARMPAs to conserve the GRSG, additional measures were included to ensure that disturbance to leks could be reduced or minimized through the application of disturbance caps and required minimum buffers.

Reducing Habitat Disturbance

Disturbance Caps

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In addition to the management actions and allocations discussed in detail in the sections above, the proposed ARMPAs also limit the amount of anthropogenic disturbances in PHMAs through the use of disturbance caps. If the 3% or 5% (depending on state) anthropogenic disturbance is exceeded on lands (regardless of land ownership) within PHMA in any given Biologically Significant Unit (BSU), no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by the BLM and Forest Service within PHMAs in that Biologically Significant Unit. In Wyoming, a different process, which does not include an analysis at the Biologically Significant Unit, is used as described below. If the disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by the BLM and the Forest Service until disturbance in the proposed project analysis area has been reduced to be under the cap (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.). Most proposed plans will implement a 3% disturbance cap, with a few modifications. Oregon does not allow more than 1% new anthropogenic disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, exceeding a 3% disturbance cap can occur at the BSU and/or the project level as long as the outcome results in a net conservation benefit and is approved by a cadre of high-level federal and state managers. Wyoming proposed plans are consistent with the State of Wyoming's Core Area Strategy, which limits all disturbances, including wildfire and vegetation treatments, within a project area (referred to as the Density and Disturbance Calculation Tool (DDCT) analysis area) to 5% within PHMAs.

The DDCT is a spatially based tool used in Wyoming that calculates both the average density of disruptive activities and total surface disturbance within the area affected by the project, or DDCT assessment area. The DDCT assessment area is created based on buffers around proposed projects (first buffer) in protected GRSG core areas, and subsequent buffers around any occupied, core area leks within the first buffer. A four mile buffer is used to identify 75% of the GRSG use around a lek. All activities will be evaluated within the context of maximum allowable disturbance (disturbance percentages, location and number of disturbances) of suitable GRSG habitat within the DDCT assessment area. In Montana, if the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational density and disturbance calculation tool (such as the DDCT), the 3% disturbance cap would be converted to a 5% cap for all sources of habitat alteration, including wildfire and vegetation treatments, within a project analysis area.

Limiting Density of Disturbance

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The proposed plans have also incorporated a cap on the density of energy and mining facilities to encourage consolidation of structures and to reduce habitat fragmentation. The cap is set at an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT report. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located into an existing disturbed area (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.). The one facility per 640 density decision does not apply to Nevada. In Wyoming, the proposed LUPs are consistent with the State of Wyoming's Core Area Strategy, which limits oil and gas development density to an average of one pad per 640 acres and uses the Density and Disturbance Calculation Tool described above.

Buffering Development Impacts

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With the exception of proposed LUPs in Wyoming, where the state plan is considered adequate to conserve GRSG, all proposed plans will evaluate impacts to leks from actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The Forest Service has incorporated the buffers as guidelines in the plan amendments. The BLM and Forest Service will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below, and as subject to applicable laws and regulations, such as the Mining Law of 1872, as Amended, valid existing rights, etc.). The lower end of the interpreted range of the lek buffer-distances is as follows:

- Linear features (roads) within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks.
- Tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.
- Low structures (e.g., fences, rangeland structures) within1.2 miles of leks.
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.
- Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.

Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization. In determining lek locations, the BLM will use the most recent active or occupied lek data available from the state wildlife agency.

For BLM and Forest Service actions in PHMAs (not including Wyoming), the BLM will apply the lek buffer-distances identified above as required conservation measures and the Forest Service as guidelines to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above. If the action cannot be located outside of the buffer-distance, the BLM and Forest Service may approve actions in PHMAs that are within the applicable lek buffer-distance identified above only if:

- The BLM, and the Forest Service, with input from the state fish and wildlife agency, determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than the distance identified above offers the same or greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.

For BLM and Forest Service actions in GHMAs (not including Wyoming), the BLM and Forest Service will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis.

- Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.
- The BLM and Forest Service may approve actions in GHMAs within the applicable lek buffer distance only if:
    - Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM or Forest Service (as appropriate) determine that a lek buffer distance other than the applicable distance identified above offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or
    - The BLM or Forest Service (as appropriate) determine that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations); and
    - Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain.

The State of Wyoming's Core Area Strategy was developed by buffering leks by 5.3 miles and is designed to protect birds and habitat within core areas using a suite of tools and mechanisms that work in concert to conserve GRSG by reducing habitat loss and fragmentation through lek buffers, disturbance limits, excluded activities, and a sophisticated mapping utility to monitor the amount and density of disturbance. The combined effect of these overlapping and reinforcing mechanisms gives FWS confidence that the lek-buffer distances in the Core Area Strategy will be protective of breeding GRSG.

Mitigation Requirements

During the implementation of the proposed LUPs, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in GRSG habitat loss and degradation, the BLM and the Forest Service will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation; Wyoming will apply a net conservation gain standard to actions in PHMA only. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action. This standard is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0* published by the FWS in September, 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse"[9]**.** Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate) and be implemented on BLM-managed lands in a manner consistent with Departmental guidance for landscape mitigation pursuant to Secretarial Order 3330[10]. If impacts from BLM and Forest Service management actions and authorized third party actions result in habitat loss and degradation that remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.

The BLM and Forest Service, via a WAFWA Management Zone GRSG Conservation Team will develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for BLM and Forest Service actions and third party authorizations that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat. Within 90 days of the issuance of the Record of Decisions, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to help guide the conservation of GRSG. This team will include membership from the respective states, Forest Service, USFWS, NRCS, and other local governments. The zonal mitigation strategy will be developed within one year of the issuance of the Record of Decisions.

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Required Design Features

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Required Design Features (RDFs) are required for certain activities in all GRSG habitat, including PHMA, GHMA, IHMA in Idaho and OHMA in Nevada (see Appendix B for RDFs for all proposed LUPs except Wyoming where the RDFs apply to PHMA only and BMPs apply to GHMA). RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not

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[9] USFWS. Greater Sage Grouse Range-Wide Mitigation Framework: Version 1.0. September 3, 2014.
[10] Secretarial Order 3330. Improving Mitigation Policies and Practices of the Department of the Interior. October 2013.

present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat;
- A specific RDF will provide no additional protection to GRSG or its habitat.

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Habitat Restoration Measures

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The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks.

In addition, since 2010, through NRCS' Sage Grouse Initiative (SGI), over 400,000 acres of private lands have been treated for removal of pinyon-juniper targeted in PACs and BLM has additionally treated over 400,000 acres of public lands. The SGI is a successful partnership with federal and state agencies, ranchers, and private landowners has been a model of cooperation and collaboration consistent with the recommendations of the authors of the 2006 WAFWA report as well as those of the COT and NTT. Additional details on the SGI and actions taken by BLM and Forest Service are included in Section VI. See also *www.**sagegrouseinitiative**.com* for additional information on SGI).

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Post-Fire Habitat Restoration

Native seed stocks have been expanded to increase their availability to aid in the restoration of native vegetation in burned sagebrush areas.[11] In collaboration with the USDA and western governors, a new seed strategy has been developed to increase the capacity to collect, store, and allocate native seed for to improve habitat restoration in priority habitat areas. Finally, the Wildland Fire Departmental Manual will be revised to incorporate direction to identify rangeland fire as a critical priority in the Department and to ensure that resource allocations reflect this priority. For example, in the Manual, Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR) funds for restoration of lands damaged by fire will be made available for 2 years and 5 years respectively (currently limited to 1 and 3 years respectively) to aid in ensuring effective restoration of burned areas.

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[11] Also addresses specific concerns raised in the NTT report. p 27

~~Disturbance caps of 3% in PHMA were established in accordance with recommendations contained in the NTT and COT reports. Disturbance will be calculated based on established Biologically Significant Units developed by interagency teams for each of the four sub-regional planning efforts in the Great Basin, as well as at the proposed project scale analysis area, and will include proximity to leks in the calculation.~~

~~The ARMPAs provide direction to apply and analyze lek buffer-distances in PHMA and GHMA as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate~~

~~Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy*, the BLM conservation strategy places heavy reliance on monitoring and evaluation to assess the success of management decisions incorporated in ARMPAs, ultimately, in the effectiveness of implementing these plans. Monitoring plans will be interagency in nature and incorporate evaluation of greater sage-grouse population trends by the states and changes in habitat condition by the Federal land management agencies.~~

~~In addition, the conservation strategy incorporates an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should declines in population levels or habitat conditions occur. If management responses to soft triggers do not adequately address the causes for population or habitat declines and "hard triggers" are reached, more significant changes in management actions and land allocations will immediately be implemented to conserve the species.~~

Response to Climate Change

With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the Integrated Rangeland Fire Management Strategy will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that supported the development of the Rangeland Fire Management Strategy [previously referenced?] are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the contiguous SFAs, and restoring habitat through mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.

Other Management Actions to Enhance GSRG Conservation Success

Commitment to Monitoring

Monitoring tied to proposed LUP decisions has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions

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Formatted: Font: (Default) Times New Roman, 11 pt, Not Bold, Font color: Auto achieving the desired conservation goals). Through effectiveness monitoring, BLM can answer questions about how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of LUPs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for LUP effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.

The BLM Assessment, Inventory, and Monitoring (AIM) Strategy (Toevs et al. 2011 and IB2012-080) describes a vision for integrated, cross-program assessment, inventory, and monitoring of resources at multiple scales of management. Following the AIM Strategy, the BLM is modernizing its resource monitoring approach to more efficiently and effectively meet local, regional, and national resource information needs. The AIM Strategy provides a process for the BLM to collect quantitative information on the condition, trend, amount, location, and spatial pattern of natural resources on the public lands. Each AIM-Monitoring survey, at any scale of inquiry (from the plot level to west-wide deployments), uses a set of core indicators, standardized field methods, remote sensing, and a statistically-valid study design to provide nationally-consistent and scientifically-defensible information to determine conditions (e.g., rangeland health) and trends on public lands.

The National-scale deployment of AIM, known as the Landscape Monitoring Framework (LMF), commenced in 2011 in coordination with NRCS, with the collection of 1,000 plots of field-collected monitoring data across the Western U.S. LMF aims to provide non-biased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. A group of GRSG habitat and sagebrush plant community subject matter experts from BLM, USFWS, WAFWA, NRCS, ARS, state wildlife agencies, and academia identified those vegetation indicators collected at LMF sampling points that inform GRSG habitat needs. The common indicators that were identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, inter-canopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of GRSG, additional plot locations in occupied GRSG habitat (Sage-grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS Rangeland Monitoring Survey. The GRSG baseline data will be collected over a five year period and an annual report will be prepared describing the status of the indicators. Beginning in year six, the annual status report will be accompanied with a trend report which will be available on an annual basis thereafter contingent upon continuation of the current monitoring budget. This information, in combination with mapping information, mid-scale habitat suitability indicator measures, and sagebrush availability information will be used to assess the effectiveness of the planning strategy.

The BLM has made significant commitments in the ARMPAs to monitoring actions to conserve GRSG habitats at multiple scales. The results from the monitoring will inform the agencies of the effectiveness of efforts to reduce disturbance and restore seasonal habitats in priority areas, and of the status of the triggers set in the proposed LUPs for adaptive management. The BLM and the Forest Service will report annually on the results of the monitoring efforts.

Adaptive Management

Each proposed LUP includes an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored - habitat loss and/or population declines.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the proposed LUPs, the BLM and Forest Service response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each proposed LUP, a soft trigger begins a dialogue between the state, FWS, and the BLM or Forest Service to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines). Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM and Forest Service proposed LUPs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM and Forest Service proposed LUPs, the BLM and/or Forest Service will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the proposed LUPs.

1.4~~3~~ Great Basin Region Planning Area

One of two regions that make up the National Greater Sage-Grouse Planning Strategy, the Great Basin Region is composed of four sub-regions, which include the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure X** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) analyses were conducted separately for each sub-region. These sub-regional boundaries were generally developed based on the identified threats to the GRSG and the Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones. Seven WAFWA Management Zones across the west were delineated in the *WAWFA 2006 Greater Sage-Grouse Comprehensive Strategy*. These large polygons were based on similar sage-grouse populations and sub-populations identified within seven floristic provinces.

The Great Basin Region consists of WAFWA Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin). The USFWS has identified a number of threats in this region, focusing on the present and widespread threats of wildfire, loss of native habitat to invasive species, and habitat fragmentation. Other threats, many of which are more localized by nature, include anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization, sagebrush elimination, as well as disturbance associated with free-roaming equids and livestock grazing.

The Great Basin Region planning area boundaries included all lands regardless of jurisdiction (see **Figure X** - Great Basin Region Planning Area - Greater Sage-Grouse Habitat Management Areas). **Table X** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

GRSG habitat management areas on BLM-administered lands in the decision area consists of lands allocated as Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table X** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.
- **GHMA**— BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft LUPA/EIS.
- **OHMA** —BLM-administered lands identified as unmapped habitat in the Draft LUPA/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.
- **IHMA** —BLM-administered lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. There are no IHMAs designated within southwestern Montana. The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the Proposed Plan.

The Great Basin Region ARMPAs also identify specific Sagebrush Focal Areas (SFAs), which are allocations that are a subset of PHMA (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). The SFAs were derived from GRSG stronghold areas described in a USFWS memorandum to the BLM titled Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes (USFWS 2014). The memorandum and associated maps provided by the USFWS identify areas that represent recognized strongholds for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species.

Table X
Land Management in the Great Basin Planning Area

Surface Land Management	NV/NE CA	ID/SW MT	Utah	Oregon	Great Basin Total
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,975,500**
USFWS	805,900	121,900	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,200**	**48,209,900**	**31,656,300**	**194,208,300**

Source: BLM GIS 2015

Table X
Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

[Figure X & Figure X will be inserted here once NOC has completed them.]

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments A, B, C, and D). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed. No further administrative remedies are available for these land use plan decisions.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in Sections 1.1 of attachments A, B, C, and D. This ROD and ARMPAs become effective on the date this ROD is signed. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

The land use decisions provide conservation measures to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals, objectives (desired outcomes), allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations
- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not for certain uses. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Management actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands, including but not limited to stipulations, guidelines, best management practices (BMPs), and required design features.

The ARMPAs' management decisions were crafted to alleviate identified threats to Greater Sage-grouse and their habitats (see **Section 1.X**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not affect valid existing rights.

The ARMPAs do not contain decisions for the mineral estates of lands located in the planning area for lands under the jurisdiction of other Federal agencies such as the Forest Service, or for private or State-owned lands and minerals that are not administered by the BLM. ARMPA decisions for surface estate only apply to BLM managed lands. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

- *Statutory requirements.* The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy.* The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

During preparation of the ARMPAs for all four sub-regions, minor changes were made to the Proposed RMP Amendments to correct errors and to clarify decisions. Clarifications and corrections made since the Proposed RMP Amendments were published on May 29, 2015 and are hereby adopted by this ROD.

2.4.1 Modifications and Clarifications by Sub-region

Modifications and clarifications are summarized below for each of the sub-regional ARMPAs.

<u>Idaho and Southwestern Montana</u>

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Nevada and Northeastern California

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Oregon

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Utah

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

2.4.2 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed RMPA/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four sub-regional PRMPAs/FEISs.

These decisions are final for the Department of the Interior. With the exception of the granted protest issues, the Director concluded that the BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party will be notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.5.1.

Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Idaho and Southwestern Montana GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Nevada and Northeastern California

For the Nevada and Northeaster California GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Nevada and Northeastern California Sub-Regional GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Oregon

For the Oregon GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Oregon GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Utah

For the Utah GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Utah GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

2.4.3 Governors Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

In some instances, modifications to the Proposed RMP Amendments were addressed based on recommendations submitted to the BLM by the applicable states. These modifications to the ARMPAs are summarized below by sub-region and are now part of the attached ARMPAs.

Idaho and Southwestern Montana

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Nevada and Northeastern California

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Oregon

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Utah

Will need to populate the "X" areas towards the end of the GCR process (end of July).

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a unique set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs influencing land management for the protection and enhancement of Greater Sage-grouse and its habitat. All management under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The alternatives differed in how fast the goals would be met, the degree to which they would be met, the emphasis placed on certain programs and activities, and whether active or passive management would occur.

The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives.

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction and prevailing conditions derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments, activity-and implementation-level plans, and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply. Many of the underlying RMPs/MFPs are outdated and

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the USFWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized importance on standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focuse on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix X, Required Design Features (RDFs), of this document.

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, most management actions in GHMA reverted back to the No Action Alternative, which was found to not meet the purpose and need for the Amendments. Alternative B was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below).

Alternative C is the most restrictive approach to GRSG conservation. It would eliminate all future ROWs, fluid mineral leasing, nonenergy leasable mineral development, and mineral material sales on GRSG habitat. Alternative C would also recommend withdrawal from locatable mineral entry for all GRSG habitat. It would manage all GRSG habitat as PHMA. This alternative would substantially reduce surface disturbance in all GRSG habitat. Under Alternative C, the BLM would take a passive management approach to vegetation management and fuels treatments. Additionally, all GRSG habitat would be unavailable for livestock grazing.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which is not required by best available science from GRSG and its habitats. Alternative C was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which were identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances that require stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while accommodating laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plan in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocation decisions were not consistent across the Great Basin. For example, in the Nevada and Northeastern California Proposed Amendment, nonenergy leasable mineral development and mineral material sales would be closed in GHMA, while in the Oregon, Utah, and Idaho and Southwestern Montana Proposed Amendments, these allocations in GHMA were open.

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem enhancements, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative provided by the State or Governor's offices for inclusion and analysis in the EISs. It incorporates guidance from specific State Conservation strategies and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on

GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. The state plan describes the Oregon Department of Fish and Wildlife's proposed management of GRSG. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, the planning area includes all occupied GRSG habitat in Utah. Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. Alternative E1 was designed to eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected, in whole, as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the ARMPA were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA, while limiting certain types of fuels treatments necessary to protect GRSG habitat. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which is not required by best available science from GRSG and its habitats. Alternative F was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM has developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focus on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative Considered in all Sub-Regions

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

Alternative C is most protective of resources, specifically GRSG habitat in the planning area and thus would be the most "environmentally preferable" as that term is defined in Question 6A of CEQ's 40 asked questions regarding NEPA, but both NEPA and FLPMA recognize resource uses as part of the policy of the United States and under the standard of FLPMA's multiple-use mandate, the Proposed Plan was determined to be the most balanced.

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- USFWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- USFWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

Utah

- USFWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah’s Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. MANAGEMENT CONSIDERATIONS

The BLM is tasked to provide multiple use management for public lands by the Federal Land Policy and Management Act (FLPMA) and numerous other laws and regulations that govern the management of public lands. Due to the diversity of community needs and stakeholders affected by management of BLM lands, there has been both support and opposition to certain components of the Proposed Plans. BLM's objective in choosing the Proposed Plan Amendments as the ARMPAs was to address diverse needs and concerns in a fair manner and provide a practical and workable framework for management of public lands in Greater Sage-grouse habitat. The BLM is ultimately responsible for preparing these ARMPAs consistent with its legal mandates that reflect collective professional judgment using the best available science. The ARMPAs provide a balance between those reasonable measures necessary to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat to meet the purpose and need of these plan amendments, and the ongoing public need for use of the public lands within the Great Basin Region planning area.

The ARMPAs were selected because they will reduce or eliminate threats to Greater Sage-Grouse at a landscape scale, improve and sustain properly functioning resource conditions, and consider needs and demands for existing or potential resource commodities and values. In the end, Greater Sage-Grouse habitat will be managed by integrating ecological, economic, and social principles in a manner that safeguards the long term sustainability, diversity and productivity of the land.

In 2012, at the FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations. **Table XX** provides a crosswalk between the threats to GRSG and their habitat identified in the COT Report and the key management responses from the ARMPAs that aim to ameliorate these threats.

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development.	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) • PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
Energy development—fluid minerals, including geothermal resources	• PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy development)
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals)
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. • Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.
Recreation	• PHMA: Do not construct new recreation facilities unless required for health and safety purposes. • Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain.
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	• GRSG habitat will be retained in federal management.

5. MITIGATION MEASURES

In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the GRSG including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the FWS in its 2010 listing decision (75 FR 13910), COT report, and depicted in the ARMPAs' Monitoring Framework (which can be found in Appendix X of each of the attached ARMPAs). Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g. avoid, minimize, and compensate). If impacts from BLM management actions and authorized third-party actions (which are consistent with the goals, objectives, and management actions in the attached ARMPAs) that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation would be durable, timely, and in addition to what would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in the Mitigation Strategy, which can be found in Appendix X of each of the attached ARMPAs).

All practical means to avoid or minimize environmental harm, specifically to Greater Sage-Grouse and its habitat are encompassed in the attached ARMPAs and associated appendices. Mitigation measures, including the application of required design features have been identified.

6. PLAN MONITORING

The BLM's Monitoring framework (Appendix X of each of the attached ARMPAs) describes the process that the BLM will use to monitor implementation and effectiveness of ARMPA decisions. The monitoring framework includes methods, data standards, and intervals of monitoring at broad- and mid-scales; consistent indicators to measure descriptions for each of the scales; analysis and reporting methods; and the incorporation of monitoring results into adaptive management.

The BLM has committed to consistently and systematically monitor the land use plans implementation actions authorized within the designated sage-grouse management areas (e.g., Sagebrush Focal Areas, Priority Habitat Management Areas, General Habitat Management Areas). An annual Implementation Monitoring Report will describe the number and types of authorized actions in each of the sage-grouse management areas and will document whether the authorized actions are in conformance with the applicable land use plan. The reporting structure will be based on the BLM program areas and use the completion date of the decision from the NEPA document in the ePlanning system.

Effectiveness monitoring includes monitoring disturbance in habitats, as well as landscape habitat attributes. To monitor habitats, the BLM will measure and track attributes of GRSG habitat management areas at the broad scale, and attributes of habitat availability, patch size, linkage/connectivity habitat, edge effect, and human disturbances at the mid-scale. Disturbance monitoring will measure and track changes in the amount of sagebrush in the landscape and changes in the human footprint, including changes in density of energy development. The framework also includes: (1) methods for analyzing and reporting for field offices, states, and BLM districts; (2) geospatial and tabular data for disturbance mapping (e.g., geospatial footprint of new permitted disturbances) and management action effectiveness.

The monitoring data will also provide the indicator estimates for adaptive management. The BLM will adjust management decisions through an adaptive management process (consistent with and in accordance with applicable law, as described in each of the specific adaptive management strategies outlined in Appendix X of the attached ARMPAs).

7. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

The BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Departments of the Interior and Agriculture policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process to develop a range of reasonable alternatives to proposed actions and to prepare environmental documents that disclose the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public and informal meetings, individual contacts, media releases, planning bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date.

7.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Proposed RMP Amendments/FEIS, Idaho and Southwestern Montana conducted seven public meetings; Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plans. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft EISs' comment periods. Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMP Amendments.

A Notice of Availability (NOA) for the Great Basin Region GRSG Proposed RMP Amendments and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governors' consistency review. Refer to **Section 2.5** for a full description of the protest period and governors' consistency review outcomes.

7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the USFWS and the U.S. Forest Service. In addition, the Great Basin sub-regions' also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 11 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. For a full list of these cooperating agencies divided by sub-region, refer to the Cooperating Agencies List at the beginning of this ROD. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs.

7.2 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the USFWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the USFWS for review. The USFWS evaluated the biological assessments and concurred with the "no affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the threatened listed Utah Prairie Dog. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix X of Attachment X).

[Verify that the above paragraph is applicable to UT once BLM UT hears back from their local FWS.]

7.3 Native American Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

The Draft RMP Amendments/EISs were provided to the Idaho, Montana, Nevada, California, Oregon, and Utah State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMP Amendments/FEISs were also provided to the SHPOs.

[Verify that the above paragraph is applicable to UT.]

8. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. The Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published on May 29, 2015, in the Federal Register (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

I hereby approve the land use plan amendments decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Sally Jewell Secretary Department of the Interior	Date

9. ATTACHMENTS

Appendix A. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix B. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Appendix C. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

Internal Draft Document – Do Not Distribute

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana; Nevada and Northeastern California; Oregon; and Utah

Prepared by:

U.S. Department of Interior
Bureau of Land Management
Washington, DC

August 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Cooperating Agencies

Great Basin Region-Wide
US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana
Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California
Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon
Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah
Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emory County
Garfield County
Grand County
Iron County
Kane County
Lincoln County
Miller County
Piute County
Rich County
San Pete County
Sevier County
State of Utah (PLPCO)
Sweetwater County
Sweetwater County Conservation District
Tooele County
Uinta County (UT and WY)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

[Insert BLM WO Letterhead]

In Reply Refer To:
In Reply, Refer to:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah~~,~~). The ROD approves the four Great Basin Region ARMPAs, which are part of fifteen other sub-regional RMP Amendments and RMP revisions associated with the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011.

Comment [KK1]: 17?

The Bureau of Land Management (BLM) ARMPAs provide a range wide, comprehensive, science-based, collaborative strategy for addressing previously identified threats to the Greater Sage-Grouse (GRSG). This strategy, ~~while~~ designed to address issues leading to the 2010 “warranted but precluded” decision by the U.S. Fish and Wildlife Service (FWS), was guided by over a decade of research, analysis and recommendations for GRSG conservation produced by the Conservation Objectives Team (COT), Western Association of Fish and Wildlife Agencies (WAFWA), and the BLM National Technical Team ~~and~~ (NTT). Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and local partners were fundamental during the development of the land use plan decisions within these ARMPAs to address the identified threats to GRSG.

It is important to note that this ROD and these ARMPAs are specific only to BLM~~-~~administered lands. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft EISs and Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy Management Act (FLPMA) requires the development and maintenance, and, as appropriate, the revision of land use plans for public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions that could significantly affect the environment. In fulfillment of these requirements, the Draft RMP Amendments/Draft EISs, incorporating analysis and input provided by the public; local, State, and

other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM personnel were published in the fall of 2013. The 90-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 letters that were submitted. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

Comment [KK2]: Great basin only?

The Proposed RMP Amendments/Final EISs were made available on May 29, 2015, for a 30-day protest period. X protest letters were received, of which X were valid protests in need of resolution. Protest issues are addressed and resolved in the Protest Summary Report, available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

After much consideration, the BLM now approves the ~~Proposed~~ RMP Amendments as the land use planning documents that will guide ~~Greater Sage-Grouse~~GRSG habitat management in the Great Basin Region for the life of the plan amendment.

Copies of the ROD and ARMPAs can be obtained from the BLM's National ~~Greater Sage-Grouse~~GRSG webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, Cooperating Agencies; local, State, and other Federal agencies; and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented and monitored for the conservation of ~~Greater Sage-Grouse~~GRSG and their habitat.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This~~e~~ Record of Decision (ROD) is the culmination of an unprecedented effort in public land management to meet the multiple-use and sustained-yield management objectives for public lands administered by the Bureau of Land Management (BLM) in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA). ~~directs the United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) to develop and periodically revise or amend its resource management plans (RMPs), which guide management of BLM-administered lands.~~

In response to a 2010 determination by the U.S. Fish and Wildlife Service (FWS) that the greater sage-grouse listing under the Endangered Species Act (ESA) is "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service) has developed a targeted, multi-tiered, landscape-level management approach, based on the best available science, that offers the highest level of protection for Greater Sage-Grouse (GRSG) in the most important habitat areas to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team (COT) report.

This~~e~~ Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs)~~ROD and ARMPAs~~ for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon; and Utah ~~provides a layered management approach that offers the highest level of protection for Greater Sage-Grouse in the most valuable habitat to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team report.~~ includes ~~L~~land use allocations in the ARMPAs that ~~would~~ limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs ~~would~~ implement a suite of management ~~tools~~ actions, such as the establishment of disturbance limits, GRSG habitat objectives, ~~and monitoring,~~ mitigation requirements~~approaches~~, monitoring protocols, and adaptive

Comment [JRL3]: The are not tools, but management actions to be implemented by the plans. DDCT is a tool, but establishing disturbance limits is a management action management triggers and responses, as well as~~nd~~ other conservation ~~protective~~ measures throughout the range. ~~These overlapping and reinforcing~~ The cumulative effect of these conservation measures ~~would~~ work in concert to protect, improve, and restore GRSG habitat ~~condition~~ across the remaining range of the species in the Great Basin and provide ~~consistency in~~ greater certainty that~~how the~~ BLM land and resource management ~~manages~~ activities in GRSG habitat in the Great Basin Region can lead to conservation of the GRSG and other sagebrush--steppe associated species in the region.

In conjunction with the management actions for GRSG included in the ROD and ARMPAs and ARMPRs for the Rocky Mountain GRSG subregion, -this ROD and ARMPAs for the Great Basin subregion provides management direction to protect and restore habitat essential to the conservation of the GRSG across its remaining range. This conservation strategy, developed in collaboration with the 11 states in which the ARMPAs and ARMPRs apply, in addition to other state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna, in order to "conserve the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT report. 2014]

Comment [JRL4]: This is the suite of actions facilitated by the plans

Comment [JRL5]: Certainty is better than "consistency" as that has become a "trigger" for negative response

Comment [JRL6]: Tie to ultimate goal and to benefit to other species and the ecosystem overall.

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Table of Contents

Summary

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached approved Resource Management Plans (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM-administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) as amended and other applicable laws. The BLM prepared environmental impact statements (EISs) in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

Comment [KK7]: Either ROD & BLM carry from the dear readers letter or all acronyms need to be redefined here.

Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All four of these Draft EISs and Final EISs and associated Land Use Plans included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

1.1 Great Basin Region Planning Area

One of two regions that make up the National Greater Sage-Grouse Planning Strategy, the Great Basin Region is composed of four sub-regions, the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure X** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) analyses were conducted, one for each sub-region. These sub-regional boundaries were developed considering the identified threats to the GRSG and the Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones. Seven WAFWA Management Zones across the west were delineated in the *WAWFA 2006 Greater Sage-Grouse Comprehensive Strategy*. These large polygons were based on similar sage-grouse populations and sub-populations identified within seven floristic provinces.

The Great Basin Region consists of WAFWA Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin). The USFWS has identified a number of threats in this region, focusing on the present and widespread threats of wildfire, loss of native habitat to invasive species, and habitat fragmentation. Other threats, some of which are more localized by nature, include anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization, sagebrush elimination, as well as disturbance associated with free-roaming equids and livestock grazing.

Comment [KK8]: changed from many to some because there are a lot of "Y" for some of these items - see threats table

The Great Basin Region planning area boundaries include all lands regardless of jurisdiction (see **Figure X** - Great Basin Region Planning Area - Greater Sage-Grouse Habitat Management Areas). **Table X** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.

Comment [KK9]: does this statement imply that we cannot make adjustments via maintenance action to the habitat boundaries? - since we very explicitly say that anything that is not inside of a habitat management area is not part of this decision making.

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

Table X
Land Management in the Great Basin Planning Area

Surface Land Management	**NV/NE CA**	**ID/SW MT**	**Utah**	**Oregon**	**Great Basin Total**
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,975,500**
USFWS	805,900	121,900	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,200**	**48,209,900**	**31,656,300**	**194,208,300**

Source: BLM GIS 2015

1.2~~1~~ THREATS TO GREATER SAGE-GROUSE

Currently, ~~Greater sage-grouse~~GRSG occupy an~~d~~ area that has been estimated to be a reduction of 44% from the historically occupied range. In addition, populations in most or all the range have been demonstrated to have declined from 1965- 2003, the period where data was collected most intensively.

The decline of the ~~greater sage-grouse (~~GRSG~~)~~ and its sagebrush--steppe habitat has been the focus of fish and wildlife agency and conservationists' concerns for decades. In 199~~5~~4 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of ~~sage-grouse~~GRSG. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of ~~sage-grouse~~GRSG population losses and degradation of sagebrush ecosystems in order to: 1) Maintain the present distribution of ~~sage-grouse~~GRSG and 2) Maintain the present abundance of ~~sage-grouse~~GRSG. In 1999 WAFWA amended the objectives to: 1) Maintain and increase where possible the present distribution of ~~sage-grouse~~GRSG and 2) Maintain and increase where possible the present abundance of ~~sage-grouse~~GRSG. The Bureau of Land Management, USFWS, and U.S. Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000.

Between May 1999 and December 2003, eight petitions were filed with the U.S. Fish and Wildlife Service (USFWS) to have sage-grouse protected under provisions of the Endangered Species Act (ESA). In 2001 the USFWS determined that greater sage-grouse in the Columbia Basin of Washington state warranted protection under provisions of the ESA. On January 12, 2005, the FWS issued a decision that listing the GRSG for protection under the ESA was not warranted. However, in response to July 14, 2006 Western Watersheds Project filing alleging that the FWS 2005 finding was incorrect and arbitrary, the U.S. District Court of Idaho ruled that the 2005 finding was "arbitrary and capricious" and remanded it to the FWS for further consideration. Ultimately, as a result, in 2010 the FWS issued a finding that listing of the Greater sage-grouse was "warranted but precluded". Subsequent to that finding, and in accordance with a settlement agreement [details?] the FWS committed to make a final determination regarding the need to list the GRSG by September 30, 2015. Two factors led -to the FWS decision to list the species as "warranted but precluded": threats to habitat and the inadequacy of existing regulatory mechanisms.

Primary threats affecting GRSG habitat on Forest Service and BLM-administered lands include infrastructure (power lines, communication towers, fences, roads, and railroads), and energy development (traditional oil and gas, mining, renewable energy, transmission corridors) within WAFWA GRSG Management Zone I, II and VII; and Fire, Invasive Weeds, and Pinyon-Juniper Encroachment within WAFWA GRSG Management Zone III, IV, V and VI. Improper grazing (livestock and wild horse) and climate change may be a threat across all management zones, and all threats exist to some degree across the range of the species. *Differences in ecological conditions within each MZ affect the susceptibility of these areas to the various threats facing sagebrush ecosystems and its potential for restoration. (FWS FRN 2010).* (See reference to WAFWA Management Zones (MZ) below.)

Additional information regarding potential threats to the GRSG is contained in the BLM National Technical Team (NTT) report and the Conservation Objectives Team (COT) reports. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG – as articulated in the COT report – is summarized in Table A~~X~~. ~~[Include from Final Landscape report.]~~

In addition, the Service found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM and the Forest Service, which manage more than 50 percent of the remaining habitat rangewide, regulatory mechanisms are the agencies' Resource Management Plans (RMPs) and Land and Resource Management Plans, respectively.

~~The Federal Land Policy and Management Act of 1976 (FLPMA) is the primary Federal law governing most land uses on BLM-administered lands, and directs development and implementation of Resource Management Plans (RMPs)[1] which direct management at a local level. As a designated sensitive species under BLM Manual 6840, GRSG conservation must be addressed in the development and implementation of RMPs on BLM lands. RMPs are the basis for all actions and authorizations involving BLM administered lands and resources. They authorize and establish allowable resource uses, resource condition goals and objectives to be attained, program constraints, general management practices needed to attain the goals and objectives, general implementation sequences, intervals and standards for monitoring and evaluating RMPs to determine effectiveness, and the need for amendment or revision (43 CFR 1601.0-5(k)).~~

~~Management of activities on National Forest System lands are guided principally by the National Forest Management Act (NFMA) (16 U.S.C. 1600-1614, August 17, 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, 1988, and 1990). NFMA specifies that the Forest Service must have a Land and Resource Management Plan (LRMP)[1] (16 U.S.C. 1604) to guide and set standards for all natural resource management activities on each National Forest or National Grassland. All of the LRMPs that currently guide the management of GRSG habitats on Forest Service lands were developed using the 1982 implementing regulations for land and resource management planning (1982 Rule, 36 CFR 219).~~

~~[1] Throughout this report, BLM Resource Management Plans (RMPs) and Forest Service Land and Resource Management Plans (LRMPs) will simply be referred to as Land Use Plans or LUPs.~~

Comment [KK10]: Delete or move to background section?

Comment [KK11]: THIS MIGHT NOW BE ABOVE

Comment [KK12]: Delete or move to management considerations or the first paragraph of the intro?

As a result, the BLM and Forest Service initiated this planning effort to provide the needed federal regulatory mechanisms and certainty, as well as to address the individual threats listed in Table X. This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft EISs and Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and associated Land and Resource Management Plans (LRMPs) under their planning authorities.

Table A. Threats to GRSG in the Great Basin Region (Utah) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan**
Rich-Morgan-Summit (UT)	9b	_	_	_	**Y**	**Y**	**Y**	**Y**	_	**Y**	_	_	**Y**	**Y**	Utah
Uintah (UT)	9c	_	_	_	**Y**	**Y**	**Y**	L	**Y**	**Y**	_	_	**Y**	**Y**	Utah
Strawberry Valley (UT)	10a	**Y**	_	_	**Y**	**Y**	**Y**	**Y**	_	**Y**	_	_	**Y**	_	Utah
Carbon (UT)	10b	**Y**	_	_	**Y**	_	**Y**	**Y**	**Y**	**Y**	_	_	**Y**	_	Utah
Sheeprock Mountains (UT)	11	**Y**	_	_	**Y**	L	L	**Y**	**Y**	L	_	**Y**	L	_	Utah
Emery (UT)	12	**Y**	_	_	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	_	_	**Y**	_	Utah
Greater Parker Mountain (UT)	13a	_	_	_	**Y**	**Y**	**Y**	_	_	**Y**	_	_	**Y**	_	Utah
Panguitch (UT)	13b	_	_	**Y**	**Y**	**Y**	**Y**	**Y**	L	**Y**	_	_	**Y**	L	Utah
Bald Hills (UT)	13c	**Y**	_	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	_	**Y**	**Y**	**Y**	Utah
Ibapah (UT)	15a	**Y**	_	_	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	_	**Y**	**Y**	_	Utah
Hamlin Valley (UT)	15b	**Y**	_	_	**Y**	**Y**	**Y**	_	_	**Y**	_	**Y**	**Y**	_	Utah
Box Elder (UT)	26b	_	_	**Y**	**Y**	**Y**	**Y**	L	**Y**	**Y**	_	_	**Y**	_	Utah

Table A. (cont.) Threats to GRSG in the Great Basin Region (OR, CA, NV, ID, SWMT) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	Unit Number	Isolated Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifers	Weeds/Annual Grasses	Energy	Mining	Infrastructure	Grazing	Free-Roaming Equids	Recreation	Urbanization	**EIS/Plan(s)**
N. Great Basin (OR, ID, NV)	26a	-	L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	ID/SW MT, OR, NV/CA
Baker (OR)	17	Y	Y	Y	Y	L	Y	L	Y	L	U	-	L	L	OR
Central Oregon (OR)	28	-	L	L	Y	Y	Y	L	Y	L	Y	U	L	L	OR
W. Great Basin (OR, CA, NV)	31	-	L	L	Y	Y	Y	L	L	L	Y	Y	U	-	OR, NV/CA
Klamath (CA)	29	Y	U	U	Y	Y	Y	L	-	U	U	U	U	U	NV/CA
Northwest Interior (NV)	14	Y	-	-	Y	-	Y	U	Y	Y	Y	Y	Y	-	NV/CA
Southern Great Basin (NV)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y	-	NV/CA
Quinn Canyon Range (NV)	16	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	NV/CA
Warm Springs Valley (NV)	30	Y	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	NV/CA
East Central (ID)	18	Y	L	Y	L	Y	L	Y	-	Y	Y	-	L	-	ID/SW MT
Snake-Salmon-Beaverhead (ID)	23	-	L	L	Y	L	Y	Y	-	L	Y	Y	L	-	ID/SW MT
Weiser (ID)	25	Y	L	L	L	L	Y	Y	-	L	Y	-	L	L	ID/SW MT
Sawtooth (ID)	27	Y	L	-	L	U	L	-	-	Y	Y	-	L	-	ID/SW MT
Southwest Montana (MT)	19-22	-	L	-	L	L	Y	L	L	L	Y	-	L	L	ID/SW MT

1.32~~1~~ ~~National Greater Sage-Grouse Planning Strategy~~Early GRSG Conservation

Comment [KK13]: This section is all background things that happened before the plans started. It isn't the national GRSG planning strategy

The BLM and the Forest Service collectively manage the majority of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State Distinct Population Segments) addressed in this planning effort. Efforts to conserve the habitat of this species did not begin with the 2011 BLM/-Forest Service Planning Strategy, but rather, have been ongoing for many years.

The Western Association of Fish and Wildlife Agencies (WAFWA) 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, contributed to by the BLM and the Forest Service, was to present an unbiased and scientific documentation of dominant issues and their effects on GRSG populations and sagebrush habitats. http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the U.S. Fish and Wildlife Service (FWS), the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG. The WAFWA Sage-Grouse Management Zones were delineated in this Strategy. http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

Comment [JRL14]: Link later if decide to use WAFWA zones to frame strategy

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation as well as summarizing BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States and Canada. http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, BLM commissioned an effort to map breeding densities of GRSG across the West. A conference was convened with the state wildlife agencies to get approval and to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active

leks across the West. This model served as a standard starting point for all states to identify priority habitat.
http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published their 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the~~a~~ species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM and Forest Service as conservation measures in land use plans.

~~Consistent with the National GRSG Planning Strategy, the BLM as the lead agency, together with the U.S. Forest Service as a cooperating agency, prepared 15 environmental impact statements (EISs), with associated plan amendments and revisions. These documents provide a set of management alternatives focused on specific conservation measures across the range of the GRSG (see Figure X, National Greater Sage-Grouse Planning Strategy Boundaries) to address the threats identified in the 2010 USFWS "warranted but precluded" decision. .~~

Comment [JRL15]: CAPs or lower case?

1.4 National Greater Sage Grouse Planning Strategy

Based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a listing decision on this species, the BLM recognized the need to incorporate explicit objectives and adequate conservation measures into RMPs by 2015 to conserve GRSG habitat and avoid the need to list the species under the Endangered Species Act. In August, 2011, the BLM chartered a planning strategy to evaluate the adequacy of BLM RMPs and address revisions and amendments throughout the range of the GRSG (with the exception of the bi-state population in California and Nevada, and the Washington state distinct population segment, which were addressed through other planning efforts). This Charter established the teams, team membership, and team operating procedures for the BLM's National GRSG Planning Strategy. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms through RMPs to conserve and

restore the GRSG and its habitat on BLM-administered lands on a range-wide basis for the long-term (Figure C).
http://www.blm.gov/style/medialib/blm/wo/Communications_Directorate/public_affairs/sage-grouse_planning/documents.Par.2415.File.dat/Final%20Signed%20GSG%20Planning%20Strategy%20Charter.pdf

~~*[Insert Figure X here.]*~~

~~Science-based decision-making and collaboration with state and local partners were fundamental to the National GRSG Planning Strategy. The 17 ARMPAs and ARMPs address threats to GRSG identified by state fish and wildlife agencies, the BLM National Technical Team (NTT), and the USFWS in the context of its listing decision and the Conservation Objectives Team (COT) report.~~

[Insert Figure C~~X~~ here.]

Two national teams, and numerous other studies were used to help inform the planning efforts. The GRSG National Technical Team (NTT), comprised of BLM, ~~Forest Service,~~ FWS, USGS, NRCS, and State specialists, completed A Report on National Greater Sage-Grouse Conservation Measures in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats in the FWS listing action (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of~~n~~ standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones.
http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

In 2012, FWS convened the~~a~~ Conservation Objectives Team (COT) of state and federal representatives to produce a peer-reviewed report ~~recommendation regarding~~ which identified the principal threats to GRSG survival -- based upon the FWS 2010 listing decision -- and the degree to which these threats need to be reduced or ameliorated to conserve the ~~greater sage-grouse~~GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. ~~The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations.~~ (See Figure A and Table A.) The COT report also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation".
http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the ARMPAs.

To adequately address the reasons for the 2010 "warranted" determination by the FWS – and specific threats summarized in the COT report -- it was clear to BLM and Forest Service land

Comment [JRL16]: If we reference a specific "Strategy", we need to explain its genesis. Should we use lower case instead or provide additional history. Former would be simpler.

Comment [JRL17]: 17?

Comment [JRL18]: The COT had not been published prior to completion of the draft EISs.

Comment [JRL19]: Forest Service was not a part of the NTT.

Comment [JRL20]: SUGGEST INCLUSION OF FIGURE ILLUSTRATING WAFWA ZONES.

Comment [JRL21]: Was not a recommendation

Comment [JRL22]: Suggest including table with list of threats from COT report.

and resource managers that additional regulatory measures on federal public lands would be necessary to deal with present or threatened destruction, modification, or curtailment of habitat or range. These measures would need to be incorporated into land use plans that guide management actions on lands within the remaining range of the GRSG administered by the agencies to conserve GRSG such that listing under the ESA was no longer necessary.

In December 2011, the BLM and the Forest Service published a Notice of Intent to prepare Environmental Impact Statements and Supplemental Environmental Impact Statements to incorporate GRSG Conservation Measures into Land Use Plans (LUPs) ~~and Land and Resource Management Plans~~ across the range of the species. A total of 15 subregional LUPs would amend or revise 78 BLM RMPs and 20 Forest LRMPs across the range of the species.

The federal public land conservation strategy reflects several key concepts:

- **Landscape-level**: The planning effort focuses on the remaining habitat of the GRSG on BLM and Forest Service lands, covering 10 western states in the Great Basin and Rocky Mountain regions.
- **Best Available Science** – The proposed LUPs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat and the NTT report, prepared by the BLM, provided options for dealing with the most significant threats to the GRSG. A series of reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the Western Association of Fish and Wildlife Agencies also provided crucial guidance in formulating the conservation strategy.
- **Targeted, Multi-Tiered Approach** – The proposed LUPs were designed to incorporate a layered management approach to avoid or minimize additional surface disturbance in the most valuable habitat, known as Priority Habitat Management Areas (PHMA), which are largely consistent with PACs identified in the COT Report. Within PHMA, the proposed LUPs provide an added level of protection to limit or eliminate new surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. In General Habitat Management Areas (GHMA), the proposed LUPs seek to minimize disturbance while providing greater flexibility for land use activities.
- **Coordinated**: The BLM and Forest Service proposed LUPs were developed through a joint planning process led by the BLM with the Forest Service as partners. The USFWS provided guidance and input throughout the process to aid land managers in understanding the threats and the certainty and effectiveness of proposed land management actions in addressing those threats. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative**: The proposed LUPs reflected the input of states and local stakeholders from the outset and were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Sage Grouse Task Force (SGTF) was particularly useful in facilitating this kind of collaborative input. The proposed LUPs reflect state and

> stakeholder developed approaches and economic priorities where consistent with conservation objectives.

The BLM ~~also~~ adopted unique state and stakeholder developed approaches and priorities within the ARMPAs. In 2011, then Secretary of the Interior Ken Salazar sent letters to each of the sage-grouse state governors asking for a report and recommendations on how to best move forward with a multi-state conservation sage-grouse plan. Most states across the range provided recommendations for the management of the BLM lands in their state to conserve ~~sage-grouse~~GRSG. In all cases, this input was incorporated into ~~state conservation plans that were part of~~ the range of alternatives analyzed in the Final EISs. Components of these state recommendations ~~conservation plans~~ were used to develop the ARMPAs.

Comment [JRL23]: Is this correct? Haven't seen this letter.

Comment [JRL24]: Confusing to refer to state recommendations for managing BLM land in a state as "state plans". Suggest this alternative. Most readers would think of state plans as state plans to manage lands within their jurisdiction.

In addition, the Western Governors Association Sage Grouse Task Force was established in 2011 to identify and ~~implement~~ recommend ~~high priority~~ state and federal conservation actions ~~and integrate ongoing actions~~ necessary to preclude the need for the GRSG to be listed under the ESA. This group, which includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, US Forest Service, US Geological Survey, and the Department of the Interior, played an integral role throughout this land use planning process.

Comment [JRL25]: SGTF did not implement

1.53~~2~~ Address~~Ameliorat~~ing Threats to the Greater Sage-Grouse ~~through the National Greater Sage-Grouse Planning Strategy~~

~~*[Need to verify with Jim and Karen what elements from the Landscape Report they would like to see here. Right now, we only included content from Section VII (Summary) of the Landscape Report, but we can change this if needed. We can even include some of the pie charts and figures from the LR if necessary.]*~~

The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to "maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations".[2] The NTT report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed"[3] And, in establishing the COT, with the backing of the SGTF, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006 WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following,

> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."

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[2] WAFWA 2006 Strategy. The 2006 objectives built on an initial framework and commitment made by the WAFWA directors, the BLM and the FWS in 2000 with the signing of an interagency sagebrush/sage-grouse conservation MOU.

[3] Sage-grouse National Technical Team. "A Report on National Greater Sage-Grouse Conservation Measures". December 21, 2011.

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

The four Great Basin ARMPAs addressed by this ROD and the 13 ARMPAs/ARMPs in the Rocky Mountain Region subregion are the result ~~product~~ of the National GRSG Planning Strategy~~, the four Great Basin ARMPAs~~ and ~~13 ARMPAs/ARMPs in the Rocky Mountain Region,~~ were developed to remove or reduce identified threats to the species and are an essential component of the effort to conserve GRSG and ~~obviate~~ avoid a listing of the species under ESA. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain updated land use plan direction on ~~nearly~~ approximately ~~6~~50 percent of the remaining habitat for the species. These ARMPAs/ARMPs are the product of extensive coordination between the BLM and the Forest Service and~~, including t~~ the active engagement of the USFWS in helping to inform land allocation and related management decisions by the BLM and Forest Service. The plans~~y~~ also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, and circumstances in each.

Comment [KK26]: From Stephanie – not sure if this is BLM only or includes FS

~~This section highlights the m~~Major components of -the ~~that are presented in the~~ attached ARMPAs ~~that~~ developed ~~were constructed~~ to address the specific threats to the viability of the GRSG, as identified in the USFWS 2010 listing decision and COT Report (many of which were also identified by the BLM's NTT Report) are listed in Table XX and summarized below. Throughout the ARMPAs, a particular focus is placed on an "avoidance first strategy" as emphasized in the COT report by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is accomplished through identification and allocation of important GRSG habitat and excluding or avoiding surface disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which although more difficult and requiring a longer time frame, is important to the long-term viability of GRSG. Restoration decisions include specific habitat objectives, and a priority on treating GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* which provide a framework, specific actions, and Department-wide priority on managing Federal lands, particularly in the Great Basin, to protect and restore sagebrush-steppe habitat.

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development.	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) • PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)
Energy development—fluid minerals, including geothermal resources	• PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy development)

Comment [KK27]: there is a NV exception for geothermal that we need to capture here

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals)
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. • Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.
Recreation	• PHMA: Do not construct new recreation facilities unless required for health and safety purposes. • Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain.

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	• PHMA & GHMA: OHV use limited to existing routes (routes to be designated through future travel management planning)
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	• GRSG habitat will be retained in federal management.

~~***Land Allocations***~~

~~The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized recommended an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."~~

~~To adequately address the reasons for the 2010 "warranted" determination by the FWS -- and specific threats summarized in the COT report -- it was clear to BLM and Forest Service land and resource managers that additional regulatory measures on federal public lands would be necessary to deal with present or threatened destruction, modification, or curtailment of habitat or range. These measures would need to be incorporated into land use plans that guide management actions on lands within the remaining range of the GRSG administered by the agencies to conserve GRSG such that listing under the ESA was no longer necessary.~~

~~In December 2011, the BLM and the Forest Service published a Notice of Intent to prepare Environmental Impact Statements and Supplemental Environmental Impact Statements to incorporate GRSG Conservation Measures into Land Use Plans and Land and Resource Management Plans across the range of the species. A total of 15 subregional LUPs would amend or revise 78 BLM RMPs and 20 Forest LRMPs across the range of the species.~~

~~The federal public land conservation strategy reflects several key concepts:~~

~~**Landscape-level**: The planning effort focuses on the remaining habitat of the GRSG on BLM and Forest Service lands, covering 10 western states in the Great Basin and Rocky Mountain regions.~~

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~~**Best Available Science** – The proposed LUPs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat and the NTT report, prepared by the BLM, provided options for dealing with the most significant threats to the GRSG. A series of reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the Western Association of Fish and Wildlife Agencies also provided crucial guidance in formulating the conservation strategy.~~

~~**Targeted, Multi-Tiered Approach** – The proposed LUPs were designed to incorporate a layered management approach to avoid or minimize additional surface disturbance in the most valuable habitat, known as Priority Habitat Management Areas (PHMA), which are largely consistent with PACs identified in the COT Report. Within PHMA, the proposed LUPs provide an added level of protection to limit or eliminate new surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. In General Habitat Management Areas (GHMA), the proposed LUPs seek to minimize disturbance while providing greater flexibility for land use activities.~~

~~**Coordinated**: The BLM and Forest Service proposed LUPs were developed through a joint planning process led by the BLM with the Forest Service as partners. The USFWS provided guidance and input throughout the process to aid land managers in understanding the threats and the certainty and effectiveness of proposed land management actions in addressing those threats. The USGS and NRCS also provided key technical and scientific support.~~

~~**Collaborative**: The proposed LUPs reflected the input of states and local stakeholders from the outset and were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Sage-Grouse Task Force (SGTF) was particularly useful in facilitating this kind of collaborative input. The proposed LUPs reflect state and stakeholder developed approaches and economic priorities where consistent with conservation objectives.~~

1.5.1 Conservation Measures for Habitat Protection, Restoration, and Improvement

Land Allocations

In order to protect the most important GRSG habitat areas, the conservation strategy began with mapping areas of important habitat across the remaining range of the GRSG and within each state. In collaboration with state fish and wildlife agencies, the BLM and Forest Service identified areas as preliminary priority habitat (PPH) and preliminary general habitat (PGH). Maps were revised and refined as further mapping was conducted and state fish and wildlife agencies – often in collaboration with GRSG experts and researchers – provided more detailed analysis of habitat characteristics and populations. The ~~proposed LUPs~~ ARMPAs reflect this input and have generally aligned these habitats with Habitat Management Areas in the ARMPAs. ~~Priority Habitat Management Areas (PHMAs) largely coincide with identified Priority Areas for Conservation (PACs) in the COT Report. Final general habitat areas are identified as General Habitat Management Areas (GHMAs). Some states developed additional habitat categories which can be found in specific state plans.~~ GRSG habitat management areas on BLM-administered lands in the decision area consists of lands allocated as Priority Habitat Management Areas (PHMA) which largely coincide with Priority Areas for Conservation in the COT report, General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table X** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.
- **GHMA**— BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft LUPA/EIS.
- **OHMA** —BLM-administered lands identified as unmapped habitat in the Draft LUPA/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse

Habitat in Nevada and Northeastern California; Coates et al. 2014.) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.

- **IHMA** —BLM-administered lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. There are no IHMAs designated within southwestern Montana. The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

Table X

Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

The ~~proposed LUPs~~ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs~~.~~ (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). SFAs correspond to the areas identified by the FWS as GRSG “strongholds” as detailed in an October 27, 2014 memo from FWS Director Ashe to BLM Director Kornze and Forest Service Chief Tidwell in response to a request to “identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection”[4] (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf)

Comment [KK28]: would be helpful to identify the acres of SFA in each state

~~The SFAs reflect a subset of these strongholds, since the FWS map included areas that are not administered by the BLM or Forest Service or were outside the planning area.~~ The FWS memo advised that “[s]trong, durable, and meaningful protection of federally administered lands in these areas will provide additional certainty and help obtain confidence for long term sage grouse persistence.” ~~The BLM and Forest Service proposed LUPs mapped approximately 66 million acres of PHMA and GHMA. Of this, approximately 35 million acres are identified as PHMA and 31 million acres are GHMA. SFAs consist of 11 million acres of BLM and Forest Service-administered lands in PHMAs. (See Figure B.)~~

Comment [KK29]: I don't think we need to say this – the following quote makes clear that these are only meant to apply to federally administered lands

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[4] Memorandum from Dan Ashe to Director, BLM and Chief, USFS, “Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes. October 27, 2014.

This tiered habitat framework provides for a nested or layered conservation design with the greatest protections and limited new surface disturbance in SFAs, a high degree of certainty that the integrity of PHMAs can be maintained through ~~land allocations~~management decisions to avoid or minimize additional surface disturbance, and protection of remaining habitats in GHMAs, with more flexibility for land use activities that would be designed to minimize impacts on existing GRSG leks. In all GRSG habitat areas, anthropogenic surface disturbing activities would be mitigated, and ~~fire-impacted~~degraded landscapes, due to fire or other causes, would be actively restored and protected with a priority on SFAs, then PHMAs, and then GHMAs. The combination of habitat classifications and land allocation decisions in the ARMPAs will provide the greatest protection for those areas identified as SFAs and meet the stated objective for these areas “where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species.”[5]

Habitat Protection/Surface Disturbance

To avoid or minimize further surface disturbance in PHMAs the ~~proposed LUPs~~ARMPAs either exclude or avoid major new surface disturbing activities. In SFAs, in addition to PHMA decisions described below and shown in Table XX, ~~proposed LUPs~~ARMPAs ~~also~~ apply a no surface occupancy stipulation with no exceptions for oil and gas leasing and recommend these areas for withdrawal from future locatable mineral entry. ~~To further protect and enhance habitat in SFAs and PHMAs, the BLM and Forest Service will prioritize rangeland fire management (either through appropriate pre-suppression activities, suppression or post-fire restoration), gathers of wild horses and burros, and review of grazing permits for compliance with land health standards, vegetative objectives and permit terms and conditions that incorporate GRSG habitat management objectives in these areas.~~

~~The combination of habitat classifications and land allocation decisions proposed for inclusion in the proposed LUPs will provide the greatest protection for those areas identified as SFAs and meet the stated objective for these areas “where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species”[6] and target habitat protection and restoration activities to those areas of highest importance. The proposed LUPs also largely avoid or exclude major development in PHMAs, in areas without an implemented all lands regulatory approach,[7] through avoidance for transmission, and exclusion for other major surface disturbing activities (e.g., solar and wind energy development).~~

Comment [KK30]: Not applicable to GB

~~In response, the~~The four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA included the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil, gas, and geothermal reserves in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region. ~~To benefit GRSG conservation efforts and to assist developers in reducing the time and cost associated with oil and gas leasing development, the BLM will prioritize new leasing in areas outside of PHMAs and GHMAs.~~

Comment [KK31]: there is a NV exception for geothermal that we need to capture here

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[5] USFWS memorandum. Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes. October 27, 2014.

~~[6] USFWS memorandum. Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes. October 27, 2014.~~

~~[7] An all lands regulatory approach refers to a management strategy in which certain activities likely to affect the conservation of GRSG, including activities on state and private lands, are regulated, such as through the Wyoming Greater Sage Grouse Conservation Plan, Greater Sage Grouse Core Area Protection Executive Order.~~

Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in PHMAs for non-energy leasable minerals and saleable minerals. An exception is granted for free use permits and the expansion of existing active pits for mineral material sales and expansion of existing non-energy leasable development. There is no potential for coal development in the Great Basin outside of Utah. In Utah, at the time of a new coal lease or lease modification, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are "essential habitat" for purposes of suitability determinations.

In all PHMAs in the Great Basin Region, ~~R~~renewable energy development (solar and wind) is excluded~~ in PHMAs in the four Great Basin ARMPAs~~, with the exception of three counties in southeastern Oregon where an avoidance allocation is applied; and ~~.~~
new rights of way and development for transmission lines, pipelines, and related infrastructure ~~will be~~is avoided through restrictions on land use authorizations. Where the allocation is avoidance, ~~E~~exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat.

Comment [JRL32]: I don't recall this exception. KK – there is this exception – see Table XX

~~Renewable energy development (solar and wind) is excluded in PHMAs in the four Great Basin ARMPAs, with the exception of three counties in southeastern Oregon where an avoidance allocation is applied.~~

~~In general, all forms of new development would be excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat. This is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*, published by the FWS in September 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse." In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation gain for the GRSG.~~

Comment [KK33]: Since this is PHMA & GHMA, I moved it down

~~In response, the four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA included the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil, gas, and geothermal reserves in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region. To benefit GRSG conservation efforts and to assist developers in reducing the time and cost associated with oil and gas leasing development, the BLM will encourage new leasing in areas outside of PHMAs, and GHMAs.~~

~~Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in PHMAs for non-energy leasable minerals and saleable minerals. An exception is granted for free use permits and the expansion of existing active pits for mineral material sales and expansion of existing non-energy leasable development. There is no potential for coal development in the Great Basin outside of Utah. In Utah, at the time of a new coal lease or lease modification, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are "essential habitat" for purposes of suitability determinations.~~

~~In all PHMA in the Great Basin Region, new rights of way and development for transmission lines, pipelines, and related infrastructure will be avoided through restrictions on land use authorizations.~~

~~Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless necessary for health and safety purposes.~~

Comment [JRL34]: I don't recall this exception. KK – there is this exception – see Table XX

~~Renewable energy development (solar and wind) is excluded in PHMAs in the four Great Basin ARMPAs, with the exception of a few counties in southeastern Oregon where an avoidance allocation is applied.~~

~~In general, all forms of new development would be excluded, avoided, or developed only if the resultant effect is a net conservation benefit to the GRSG or its habitat. In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation benefit for the GRSG.~~
While ~~the majority of compelling~~ restrictions on future development in PHMA are intended to avoid o~~i~~r minimize additional surface disturbance, ~~are placed in PHMA,~~ restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation, see Table XX for more details on GHMA management decisions. ~~However, any disturbance is subject to mitigation and should seek to first avoid and then minimize any impacts to GRSG or its habitat, while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species. As noted in the COT report, "… Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation- activities outside of PACs are proposed, the project proponent should work with federal , state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."~~

Comment [KK35]: Replaced with text just below – so mitigation is described once

In addition to areas where uses are excluded or avoided, the ARMPAs direct the BLM to proactively prioritize oil and gas leasing and development outside of identified SFAs, PHMAs, and GHMAs in order to encourage new development in areas that would not conflict with GRSG and thus maximize the potential to limit disturbance to remaining GRSG habitat. ~~To benefit GRSG conservation efforts and to~~This approach will also assist developers in reducing the time and cost associated with oil and gas leasing development by avoiding sensitive areas and decreasing the need for compensatory mitigation~~, the BLM will prioritize new leasing in areas outside of PHMAs and GHMAs.~~

In general, all forms of new development would be excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat, assuring that existing habitat would be protected and providing opportunities through compensatory mitigation to restore degraded habitats. This is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*, published by the FWS in September 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse." In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation gain for the GRSG. With regards to GHMA, a~~A~~s noted in the COT report, "… Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation- activities outside of PACs are proposed, the project proponent should work with federal , state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

Comment [KK36]: Does this belong here or with other restoration decisions?

~~An added element of habitat protection was provided for GRSG strongholds in the ARMPAs by identifying Sagebrush Focal Areas (SFAs), a subset of PHMAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memo from FWS Director Ashe to BLM Director Kornze and Forest Service Chief Tidwell in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection"(http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf). Beyond that in PHMA, management decisions to be applied to SFAs include NSO stipulation with no exceptions for oil, gas, and geothermal development; recommendation that these areas be withdrawn by the Secretary from mineral entry under the 1872 Mining Act, and prioritizing grazing permit renewal, wildhorse and burro management, and vegetation management. While the SFAs have minimal land surface disturbance and, based on existing, available data, limited mineral potential, valid existing rights – as in all habitat – will be recognized and be able to proceed in accordance with their legal rights.~~

~~Management Direction, Prioritization, and Mitigation~~

~~In addition to land allocations to protect SFAs, PHMAs, and GHMAs, the ARMPAs guide other uses of these landscapes to meet COT objectives consistent with existing, authorized uses of GRSG habitats and the sagebrush landscape.~~

In addition to major surface disturbing activities such as energy and infrastructure development, the ARMPAs address other activities, including grazing, wild horse and burro management, and recreation. Grazing is the most widespread use of the sagebrush steppe ecosystem in the Great Basin states. The COT Report recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the four Great Basin ARMPAs require the incorporation of GRSG seasonal habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritize the review and monitoring of grazing permits, and take numerous actions to avoid and minimize the impacts of range management structures (see Table XX). ~~[Incorporate additional measures for veg objectives]~~

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will focus on maintaining WHB Herd Management Areas in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives, including completing~~e~~ rangeland health assessments, ~~for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The BLM will~~ prioritizing~~e~~ gathers and population growth suppression techniques, and developing or amending Herd Management Area plans to incorporate GRSG habitat objectives and management considerations. ~~in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts – placing emphasis on addressing conflicts with WHBs in SFAs, PHMAs, and GHMAs.~~ In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. ~~The BLM will develop or amend herd management area plans to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFAs and PHMAs.~~

~~The BLM will focus on maintaining HMAs in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives and consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting~~

~~GRSG habitat objectives where HMAs overlap with GRSG habitat. When conducting NEPA analysis for WHB management activities, water developments, or other rangeland improvements for WHB, the BLM will address the direct and indirect effects to GRSG populations and habitat. The BLM will coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program.~~

~~The Great Basin ARMPAs place a priority on completing land heath assessments in SFAs, then PHMAs and GHMAs. The assessments will evaluate if grazing standards and guidelines are met, ensure that GRSG seasonal habitat objectives are also being met or are making progress towards being met, and ensure that the GRSG seasonal habitat objectives are incorporated into grazing permits.~~

~~Direction in the ARAMPs also incorporates GRSG seasonal habitat objectives into establishment of allowable management levels (AMLs). Prioritization of horse gathers and removal to reach AMLs in SFAs, PHMAs, and GHMAs (in that order) will be conducted.~~

~~Through required design features, buffers, and other management actions, proposed LUPs allow range developments which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. The NV/CA and OR proposed LUP removes livestock ponds built in perennial channels that are negatively impacting riparian habitats and do not permit new ones to be built in these areas subject to valid existing rights.~~

~~Management actions and required design features will ensure that the impact of fences on GRSG is minimized. Methods to be applied include marking fences in high-risk areas for collision and locating fences to limit or eliminate the impact on GRSG.~~

~~Fire represents the greatest threat to sage-grouse habitat in the Great Basin Region. Recognizing the nature and extent of this threat, the ARMPAs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire. The four ARMPAs include specific guidance for fire prevention and the restoration of lands impacted by fire. The Great Basin ARMPAs also provide for a more aggressive, targeted effort to prevent and suppress fires that could impact thousands of acres of sage-grouse habitat, as well as restore areas with high potential to survive the impacts of climate change and subsequent rangeland fires.~~

To ameliorate the threat from recreational activities, new facilities or expansion of existing facilities (e.g., roads, trails, campgrounds) will not be authorized in PHMA ~~on BLM-administered and National Forest System land~~ unless the development results in a net conservation gain to GRSG its habitat. ~~During renewal, amendment, or reauthorization, terms and conditions in existing permits and operating plans will be modified to protect and/or restore GRSG habitat.~~

In PHMA and GHMA ~~(except only in PHMA in Northwest Colorado),~~ travel would be limited to vehicle routes. Initially, vehicles would be limited to existing routes until implementation travel management planning could be completed to designate routes~~; on Forest Service lands travel is limited to the Forest Service travel management system~~. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning process.

~~To ameliorate the threat from new land authorizations for infrastructure, the proposed LUPs provide that major pipeline and transmission line development will be avoided in all GRSG habitats through restrictions on land use authorizations(except in GHMA in Wyoming, Utah and Idaho). Exceptions would~~

~~be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated.~~

~~GHMA in Wyoming, Utah and Idaho would be available to rights-of-way for infrastructure due to the extent and quality of the habitat as well as the percentage of GRSG contained in PHMA in those states. An additional consideration in Wyoming is the extent of the protections for GRSG on private and state land. These factors gave BLM confidence, after input from FWS, that conservation objectives can be met with this additional flexibility provided in GHMA.~~

~~Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of three priority lines has been underway for a number of years. These lines are critical to expanding access to renewable sources of energy and to improving the reliability of the Western grid. For these reasons, planning for these lines will proceed and potential impacts to GRSG will be fully mitigated through the mitigation identified in the site-specific NEPA for those projects.~~

Habitat Management, Restoration, and Improvement

In addition to management of resource uses and avoiding surface disturbance, the ARMPAs identify management actions to promote the restoration and improvement of GRSG habitat, particularly addressing the threats of invasive species, pinyon and juniper expansion, and fire, as well as climate change. As with the management of uses, habitat management, restoration, and improvement action is prioritized first in SFAs, followed by PHMA, and then GHMA. The ARMPAs specify seasonal habitat objectives necessary for GRSG, used both to evaluate grazing and wild horse and burro management and for restoration purposes. These objectives include maintaining a minimum of 70% of lands capable of producing sagebrush with 10-30% canopy cover, and addressing species richness and composition, as well as meeting land health standards considering the ecological potential for the site.

The ARMPAs include specific decisions related to treatment and removal of invasive annual grasses, removal of encroaching pinyon juniper, prioritization of fire suppression in SFA, PHMA, and GHMA, and post-fire restoration. The ARMPAs also describe a robust compensatory mitigation program, which will be developed in coordination with the states, to provide for habitat protection and restoration activities that produce a net conservation gain for the GRSG, see Section 5 for more information.

To ameliorate the threat from fire, the ~~proposed LUPs~~ARMPs seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used unless necessary to facilitate site preparation for restoration of GRSG habitat. ~~If prescribed fire is used to facilitate site preparation for restoration the associated NEPA analysis must identify how the project would move towards GRSG desired conditions, why alternative techniques were not selected, and how potential threats to GRSG habitat would be minimized.~~ The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks. Through guidance in the proposed ARMPAs supplemented by the *Integrated Rangeland Fire Management Strategy*, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.~~.~~

~~Through both the proposed LUPs and the final report to the Secretary on an Integrated Rangeland Fire Management Strategy[8](see section VI for more information), changes in land management practices and fire management policies and practices to prevention, suppression, and restoration landscapes impacted by fire have been adopted. Section VI further details the activities and actions that the BLM and the Forest Service will conduct to ameliorate the threat to GRSG and its habitat from rangeland fire. The BLM/Forest Service are involved in several west-wide efforts with other Federal, state, and private partners to address the threat of rangeland fire.~~

In addition to and complementing the ARMPAs described in this ROD, ~~,~~Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department".** (emphasis added) The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes in areas identified by the Fire and Invasives Assessment Tool (FIAT) in priority habitat, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT process, applying recent science, identified highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rural Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

Comment [KK37]: Should this be included in the ROD or is the previous paragraph sufficient (since it ties more to the AMRMPA instead of just being about the rangeland fire strategy?)

~~Response to Climate Change~~

With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that inform that ARMPAs and supported the development of the *Integrated Rangeland Fire Management Strategy* ~~[previously referenced?]~~ are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the ~~contiguous~~ SFAs, ensuring the integrity of the PHMAs, and restoring habitat through fuels management, post-fire restoration, and mitigation efforts,

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~~[8] *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary*. Department of the Interior. May 1, 2015.~~

connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.

~~A related concern is conservation strategies to limit the spread of cheatgrass in the Great Basin, which negatively affects the establishment of native grasses and sage-steppe vegetation and increases the risk of rangeland fire. To respond, all proposed Great Basin subregion ARMPAs include the following vegetation objective: *In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with at least 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).*[9]~~

~~Through guidance in the proposed ARMPAs supplemented by the Integrated Rangeland Fire Management Strategy, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.~~

~~***Lek protection***~~

~~In addition to land allocations and management actions included in the Great Basin ARMPAs to conserve the GRSG, additional measures were included to ensure that disturbance to leks could be reduced or minimized through the application of disturbance caps and required minimum buffers.~~

1.5.2 Other Measures to Reduce~~ing~~ Habitat Disturbance

Comment [KK38]: This might be better above the section that I titled habitat management, restoration, and improvement since it goes back to talking about managing uses and goes better with the section I titled "habitat protection and surface disturbance"

In addition to land allocations and management actions included in the Great Basin ARMPAs to conserve the GRSG, additional measures were included to ensure that disturbance to leks could be reduced or minimized through the application of disturbance caps, density limits, and required minimum buffers.

Disturbance Caps

In addition to the management actions and allocations discussed in detail in the sections above, the ~~proposed~~ ARMPAs ~~also~~ limit the amount of anthropogenic disturbances in PHMAs through the use of disturbance caps. In general, if the 3% ~~or 5% (depending on state)~~ anthropogenic disturbance is exceeded on lands (regardless of land ownership) within PHMA in any given Biologically Significant Unit (BSU), no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted ~~by the BLM and Forest Service~~ within PHMAs in that Biologically Significant Unit. ~~In Wyoming, a different process, which does not include an analysis at the Biologically Significant Unit, is used as described below.~~ If the disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted ~~by the BLM and the Forest Service~~ until disturbance in the proposed project analysis area has been reduced to be under the cap (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.). ~~Most proposed plans will implement a 3% disturbance cap, with a few modifications.~~The ARMPAs have a few modifications to the disturbance cap: Oregon does not allow more than 1% new anthropogenic

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disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, exceeding a 3% disturbance cap can occur at the BSU and/or the project level as long as the outcome results in a net conservation benefit and is approved by a cadre of high-level federal and state managers. ~~Wyoming proposed plans are consistent with the State of Wyoming's Core Area Strategy, which limits all disturbances, including wildfire and vegetation treatments, within a project area (referred to as the Density and Disturbance Calculation Tool (DDCT) analysis area) to 5% within PHMAs.~~

~~The DDCT is a spatially based tool used in Wyoming that calculates both the average density of disruptive activities and total surface disturbance within the area affected by the project, or DDCT assessment area. The DDCT assessment area is created based on buffers around proposed projects (first buffer) in protected GRSG core areas, and subsequent buffers around any occupied, core area leks within the first buffer. A four mile buffer is used to identify 75% of the GRSG use around a lek. All activities will be evaluated within the context of maximum allowable disturbance (disturbance percentages, location and number of disturbances) of suitable GRSG habitat within the DDCT assessment area. In Montana, if the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational density and disturbance calculation tool (such as the DDCT), the 3% disturbance cap would be converted to a 5% cap for all sources of habitat alteration, including wildfire and vegetation treatments, within a project analysis area.~~

Limiting Density of Disturbance

The ~~proposed plans~~ARMPAs ~~have also~~ incorporate~~d~~ a cap on the density of energy and mining facilities to encourage consolidation of structures and to reduce habitat fragmentation. The cap is set at an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT report. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located into an existing disturbed area, ~~(~~subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc~~.)~~. The one facility per 640 density decision does not apply to Nevada. ~~In Wyoming, the proposed LUPs are consistent with the State of Wyoming's Core Area Strategy, which limits oil and gas development density to an average of one pad per 640 acres and uses the Density and Disturbance Calculation Tool described above.~~

Buffering Development Impacts

~~With the exception of proposed LUPs in Wyoming, where the state plan is considered adequate to conserve GRSG, all proposed plans will~~ The ARMPAs require that ~~evaluate~~ impacts to leks be evaluated for~~from~~ actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from ~~the following~~ certain activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The lek buffer distances required vary by type of disturbance (road, energy development, infrastructure, etc.) and are fully described in Appendix XX of the ARMPAs.~~The Forest Service has incorporated the buffers as guidelines in the plan amendments. The BLM and Forest Service will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are~~

Comment [KK39]: is this a common appendix that we can reference?

~~determined to be appropriate (see below, and as subject to applicable laws and regulations, such as the Mining Law of 1872, as Amended, valid existing rights, etc.). The lower end of the interpreted range of the lek buffer distances is as follows:~~
~~Linear features (roads) within 3.1 miles of leks~~
~~Infrastructure related to energy development within 3.1 miles of leks.~~
~~Tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.~~
~~Low structures (e.g., fences, rangeland structures) within1.2 miles of leks.~~
~~Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.~~
~~Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.~~

~~Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer distances will require appropriate analysis and disclosure as part of activity authorization. In determining lek locations, the BLM will use the most recent active or occupied lek data available from the state wildlife agency.~~

~~For BLM and Forest Service actions in PHMAs (not including Wyoming), the BLM will apply t~~The lek buffer ~~-~~distances ~~identified above~~ will be applied as required conservation measures ~~measures and the Forest Service as guidelines~~ to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s)~~-~~ as defined in the ARMPAs~~identified above~~. In PHMA, i~~I~~f the action cannot be located outside of the buffer-distance, the BLM ~~and Forest Service~~ may approve actions in PHMAs that are within the applicable lek buffer-distance ~~identified above~~ only if ~~:~~
~~The BLM, and the Forest Service, with input from the state fish and wildlife agency, determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than the distance identified above~~a different buffer distance offers the same or greater level of protection to GRSG and its habitat. ~~, including conservation of seasonal habitat outside of the analyzed buffer area.~~
~~For BLM and Forest Service actions in GHMAs (not including Wyoming), the BLM and Forest Service will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis.~~
~~Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.~~
~~The BLM and Forest Service may approve actions i~~In GHMAs actions may be approved within the applicable lek buffer distance only if ~~:~~
~~Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM or Forest Service (as appropriate) determine that a lek buffer distance other than the applicable distance identified above~~ a different distance offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or
~~The BLM or Forest Service (as appropriate) determine that~~ impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations) ~~;~~and

~~A~~any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain.

~~The State of Wyoming's Core Area Strategy was developed by buffering leks by 5.3 miles and is designed to protect birds and habitat within core areas using a suite of tools and mechanisms that work in concert to conserve GRSG by reducing habitat loss and fragmentation through lek buffers, disturbance limits, excluded activities, and a sophisticated mapping utility to monitor the amount and density of disturbance. The combined effect of these overlapping and reinforcing mechanisms gives FWS confidence that the lek-buffer distances in the Core Area Strategy will be protective of breeding GRSG.~~

~~*Mitigation Requirements*~~

~~During the implementation of the proposed LUPs, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in GRSG habitat loss and degradation, the BLM and the Forest Service will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation; Wyoming will apply a net conservation gain standard to actions in PHMA only. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action. This standard is consistent with the recommendation included in the~~ ~~*Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*~~ ~~published by the FWS in September, 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse"[10]. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate) and be implemented on BLM-managed lands in a manner consistent with Departmental guidance for landscape mitigation pursuant to Secretarial Order 3330[11]. If impacts from BLM and Forest Service management actions and authorized third party actions result in habitat loss and degradation that remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.~~

~~The BLM and Forest Service, via a WAFWA Management Zone GRSG Conservation Team will develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for BLM and Forest Service actions and third party authorizations that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat. Within 90 days of the issuance of the Record of Decisions, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to help guide the conservation of GRSG. This team will include membership from the respective states, Forest Service, USFWS, NRCS, and other local governments. The zonal mitigation strategy will be developed within one year of the issuance of the Record of Decisions.~~

Comment [KK40]: Mitigation has it own section (V) and I didn't think it quite fit between buffers & RDFs, so I added a bit of the text here to Section 5 and referenced it from the new section above habitat management, restoration, and improvement

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~~[10] USFWS. Greater Sage Grouse Range-Wide Mitigation Framework: Version 1.0. September 3, 2014.~~

~~[11] Secretarial Order 3330. Improving Mitigation Policies and Practices of the Department of the Interior. October 2013.~~

Required Design Features

Required Design Features (RDFs) and Best Management Practices (BMPs) are required for certain activities in all GRSG habitat, including PHMA, GHMA, IHMA in Idaho and OHMA in Nevada ~~(see Appendix B for RDFs for all proposed LUPs except Wyoming where the RDFs apply to PHMA only and BMPs apply to GHMA).~~ RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). RDFs and BMPs have been developed for oil and gas development, infrastructure, range developments, and other surface disturbing activities and are fully described in Appendix XX of the ARMPAs.~~All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:~~

~~A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;~~
~~An alternative RDF is determined to provide equal or better protection for GRSG or its habitat;~~
~~A specific RDF will provide no additional protection to GRSG or its habitat.~~

Comment [KK41]: is this a common appendix that we can reference?

~~*Habitat Restoration Measures*~~

Comment [KK42]: Moved up under a new section titled "habitat management, restoration, and improvement)

~~The BLM Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks.~~

~~In addition, since 2010, through NRCS' Sage Grouse Initiative (SGI), over 400,000 acres of private lands have been treated for removal of pinyon-juniper targeted in PACs and BLM has additionally treated over 400,000 acres of public lands. The SGI is a successful partnership with federal and state agencies, ranchers, and private landowners has been a model of cooperation and collaboration consistent with the recommendations of the authors of the 2006 WAFWA report as well as those of the COT and NTT. Additional details on the SGI and actions taken by BLM and Forest Service are included in Section VI. See also for additional information on SGI).~~

~~*Post-Fire Habitat Restoration*~~

~~Native seed stocks have been expanded to increase their availability to aid in the restoration of native vegetation in burned sagebrush areas.[12] In collaboration with the USDA and western governors, a new seed strategy has been developed to increase the capacity to collect, store, and allocate native seed for to improve habitat restoration in priority habitat areas. Finally, the~~

~~[12] Also addresses specific concerns raised in the NTT report. p 27~~

~~Wildland Fire Departmental Manual will be revised to incorporate direction to identify rangeland fire as a critical priority in the Department and to ensure that resource allocations reflect this priority. For example, in the Manual, Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR) funds for restoration of lands damaged by fire will be made available for 2 years and 5 years respectively (currently limited to 1 and 3 years respectively) to aid in ensuring effective restoration of burned areas.~~

~~Disturbance caps of 3% in PHMA were established in accordance with recommendations contained in the NTT and COT reports. Disturbance will be calculated based on established Biologically Significant Units developed by interagency teams for each of the four sub-regional planning efforts in the Great Basin, as well as at the proposed project scale analysis area, and will include proximity to leks in the calculation.~~

~~The ARMPAs provide direction to apply and analyze lek buffer-distances in PHMA and GHMA as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate~~

~~Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy*, the BLM conservation strategy places heavy reliance on monitoring and evaluation to assess the success of management decisions incorporated in ARMPAs, ultimately, in the effectiveness of implementing these plans. Monitoring plans will be interagency in nature and incorporate evaluation of greater sage-grouse population trends by the states and changes in habitat condition by the Federal land management agencies.~~

~~In addition, the conservation strategy incorporates an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should declines in population levels or habitat conditions occur. If management responses to soft triggers do not adequately address the causes for population or habitat declines and "hard triggers" are reached, more significant changes in management actions and land allocations will immediately be implemented to conserve the species.~~

~~*Response to Climate Change*~~

Comment [KK43]: Moved up under a new section titled "habitat management, restoration, and improvement)

~~With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the Integrated Rangeland Fire Management Strategy will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that supported the development of the Rangeland Fire Management Strategy [previously referenced?] are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the contiguous SFAs, and restoring habitat through mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.~~

1.5.3 Other Management Actions to Enhance GSRG Conservation Success

Commitment to Monitoring

Comment [KK44]: There is also monitoring is section 6. However, this clearly needs to be co-located with Adaptive Management, so either Adaptive Management needs to move to section 6 or Monitoring needs to move here. . I think our RODs are supposed to have the monitoring section as standalone, so we need to be sure we understand that.

Monitoring tied to ~~proposed LUP~~the ARMPAs ~~decisions~~ has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can answer questions about how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of ~~LUPs~~ARMPAs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for ~~LUP~~ARMPA effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.

The BLM Assessment, Inventory, and Monitoring (AIM) Strategy (Toevs et al. 2011 and IB2012-080) describes a vision for integrated, cross-program assessment, inventory, and monitoring of resources at multiple scales of management. Following the AIM Strategy, the BLM is modernizing its resource monitoring approach to more efficiently and effectively meet local, regional, and national resource information needs. The AIM Strategy provides a process for the BLM to collect quantitative information on the condition, trend, amount, location, and spatial pattern of natural resources on the public lands. Each AIM-Monitoring survey, at any scale of inquiry (from the plot level to west-wide deployments), uses a set of core indicators, standardized field methods, remote sensing, and a statistically-valid study design to provide nationally-consistent and scientifically-defensible information to determine conditions (e.g., rangeland health) and trends on public lands.

The National-scale deployment of AIM, known as the Landscape Monitoring Framework (LMF), commenced in 2011 in coordination with NRCS, with the collection of 1,000 plots of field-collected monitoring data across the Western U.S. LMF aims to provide non-biased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. A group of GRSG habitat and sagebrush plant community subject matter experts from BLM, USFWS, WAFWA, NRCS, ARS, state wildlife agencies, and academia identified those vegetation indicators collected at LMF sampling points that inform GRSG habitat needs. The common indicators that were identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, inter-canopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of GRSG, additional plot locations in occupied GRSG habitat (Sage-grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS Rangeland Monitoring Survey. The GRSG baseline data will be collected over a five year period and an annual report will be prepared describing the status of the indicators. Beginning in year six, the annual status report will be accompanied with a trend report which will be available on an annual basis thereafter contingent upon continuation of the current monitoring budget. This information, in combination with mapping information, mid-scale habitat suitability indicator measures, and sagebrush availability information will be used to assess the effectiveness of the planning strategy.

The BLM has made significant commitments in the ARMPAs to monitoring actions to conserve GRSG habitats at multiple scales. The results from the monitoring will inform the agencies of the effectiveness of efforts to reduce disturbance and restore seasonal habitats in priority areas, and of the status of the triggers set in the proposed LUPs for adaptive management. The BLM and the Forest Service will report annually on the results of the monitoring efforts.

Adaptive Management

~~Each~~The ~~proposed LUP~~ARMPAs include~~s~~ an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored - habitat loss and/or population declines. Adaptive Management with specific triggers provide additional certainty that the regulatory mechanisms included in the ARMPAs are robust and able to respond to a variety of conditions and circumstances quickly and effectively to conserve GRSG habitat.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the proposed LUPs, the BLM and Forest Service response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each proposed LUP, a soft trigger begins a dialogue between the state, FWS, and the BLM or Forest Service to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a “hard” trigger (which signals more severe habitat loss or population declines). Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM and Forest Service proposed LUPs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM and Forest Service proposed LUPs, the BLM and/or Forest Service will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the proposed LUPs.

~~1.43 Great Basin Region Planning Area~~

~~One of two regions that make up the National Greater Sage-Grouse Planning Strategy, the Great Basin Region is composed of four sub-regions, which include the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure X** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) analyses were conducted separately for each sub-region. These sub-regional boundaries were generally developed based on the identified threats to the GRSG and the Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones. Seven WAFWA Management Zones across the west were delineated in the *WAWFA 2006 Greater Sage-Grouse Comprehensive Strategy*. These large polygons were based on similar sage-grouse populations and sub-populations identified within seven floristic provinces.~~

~~The Great Basin Region consists of WAFWA Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin). The USFWS has identified a number of threats in this region, focusing on the present and widespread threats of wildfire, loss of native habitat to invasive species, and habitat fragmentation. Other threats, many of which are more localized by nature, include anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization, sagebrush elimination, as well as disturbance associated with free-roaming equids and livestock grazing.~~

~~The Great Basin Region planning area boundaries included all lands regardless of jurisdiction (see **Figure X** – Great Basin Region Planning Area – Greater Sage-Grouse Habitat Management Areas). **Table X** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub-regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management~~

~~areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.~~

~~The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.~~

~~GRSG habitat management areas on BLM-administered lands in the decision area consists of lands allocated as Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table X** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.~~

~~PHMA, GHMA, OHMA, and IHMA are defined as follows:~~

- ~~**PHMA** – BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.~~
- ~~**GHMA** – BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft LUPA/EIS.~~
- ~~**OHMA** – BLM-administered lands identified as unmapped habitat in the Draft LUPA/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.~~
- ~~**IHMA** – BLM-administered lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. There are no IHMAs designated within southwestern Montana. The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the Proposed Plan.~~

~~The Great Basin Region ARMPAs also identify specific Sagebrush Focal Areas (SFAs), which are allocations that are a subset of PHMA (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). The SFAs were derived from GRSG stronghold areas described in a USFWS memorandum to the BLM titled Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes (USFWS 2014). The memorandum and associated maps provided by the USFWS identify areas that represent recognized strongholds for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species.~~

~~Table X~~
~~Land Management in the Great Basin Planning Area~~

~~**Surface Land Management**~~	~~**NV/NE CA**~~	~~**ID/SW MT**~~	~~**Utah**~~	~~**Oregon**~~	~~**Great Basin Total**~~
~~BLM~~	~~45,359,000~~	~~12,449,000~~	~~20,387,200~~	~~12,615,900~~	~~**90,811,100**~~
~~Forest Service~~	~~9,719,900~~	~~13,252,400~~	~~7,396,300~~	~~6,454,800~~	~~**36,823,400**~~
~~Private~~	~~11,857,800~~	~~13,637,700~~	~~10,818,200~~	~~10,907,900~~	~~**47,221,600**~~
~~Bureau of Indian Affairs (tribal)~~	~~922,000~~	~~343,600~~	~~1,140,000~~	~~191,900~~	~~**2,975,500**~~
~~USFWS~~	~~805,900~~	~~121,900~~	~~121,900~~	~~482,500~~	~~**1,491,700**~~
~~Other~~	~~326,100~~	~~414,400~~	~~30,400~~	~~100,700~~	~~**871,600**~~
~~State~~	~~195,600~~	~~2,646,100~~	~~5,137,200~~	~~723,100~~	~~**8,702,000**~~
~~National Park Service~~	~~160,100~~	~~511,700~~	~~1,365,600~~	~~0~~	~~**2,037,400**~~
~~Other federal~~	~~3,200~~	~~562,200~~	~~0~~	~~61,300~~	~~**626,700**~~
~~Bureau of Reclamation~~	~~431,200~~	~~116,300~~	~~800~~	~~52,700~~	~~**601,000**~~
~~Local government~~	~~17,800~~	~~0~~	~~0~~	~~900~~	~~**18,700**~~
~~Department of Defense~~	~~402,000~~	~~127,400~~	~~1,812,300~~	~~64,500~~	~~**2,406,200**~~
~~**Total acres**~~	~~**70,200,600**~~	~~**44,142,200**~~	~~**48,209,900**~~	~~**31,656,300**~~	~~**194,208,300**~~

~~Source: BLM GIS 2015~~

~~GRSG habitat management areas on BLM-administered lands in the decision area consists of lands allocated as Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table X** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.~~

~~PHMA, GHMA, OHMA, and IHMA are defined as follows:~~

- ~~**PHMA** – BLM administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.~~
- ~~**GHMA** – BLM administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft LUPA/EIS.~~
- ~~**OHMA** – BLM administered lands identified as unmapped habitat in the Draft LUPA/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.~~
- ~~**IHMA** – BLM administered lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. There are no IHMAs designated within southwestern Montana. The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands~~

~~serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the Proposed Plan.~~

~~The Great Basin Region ARMPAs also identify specific Sagebrush Focal Areas (SFAs), which are allocations that are a subset of PHMA (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). The SFAs were derived from GRSG stronghold areas described in a USFWS memorandum to the BLM titled Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes (USFWS 2014). The memorandum and associated maps provided by the USFWS identify areas that represent recognized strongholds for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species.~~

~~Table X~~

~~Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region~~

~~BLM administered surface acres~~	**~~PHMA~~**	**~~GHMA~~**	**~~OHMA~~**	**~~IHMA~~**
~~Idaho and Southwestern MT~~	~~4,627,200~~	~~2,179,700~~	~~0~~	~~2,737,600~~
~~Utah~~	~~2,023,400~~	~~502,500~~	~~0~~	~~0~~
~~Oregon~~	~~4,547,000~~	~~5,660,150~~	~~0~~	~~0~~
~~Nevada and Northeastern CA~~	~~9,309,700~~	~~5,720,600~~	~~5,876,600~~	~~0~~
~~Total Acres~~	**~~20,507,300~~**	**~~14,062,950~~**	**~~5,876,600~~**	**~~2,737,600~~**

~~Source: BLM GIS 2015~~

[Figure X & Figure X will be inserted here once NOC has completed them.]

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments A, B, C, and D). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed. No further administrative remedies are available for these land use plan decisions.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in Sections 1.1 of attachments A, B, C, and D. This ROD and ARMPAs become effective on the date this ROD is signed. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

The land use decisions provide conservation measures to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and~~,~~ objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses
- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not for certain uses. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Comment [KK45]: We also use these allocations to prioritize conservation and restoration management actions, not just allowable uses

Management actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands, including but not limited to stipulations, guidelines, best management practices (BMPs), and required design features.

Comment [KK46]: Are we really considering BMPs RMP decisions? Does that mean they cannot be changed without a RMP amendment?

The ARMPAs' management decisions were crafted to alleviate identified threats to ~~Greater Sage-grouse~~GRSG and their habitats (see **Section 1.X**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not affect valid existing rights.

The ARMPAs do not contain decisions for the mineral estates of lands located in the planning area for lands under the jurisdiction of other Federal agencies such as the Forest Service, or for private or State-owned lands and minerals that are not administered by the BLM. ARMPA decisions for surface estate only apply to BLM managed lands. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

Comment [KK47]: This is a "what the ROD & ARMPA does provide" not what it doesn't – and it would be helpful to have the same "what the subsurface decisions do apply to" sentence.

- *Statutory requirements.* The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy.* The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

During preparation of the ARMPAs for all four sub-regions, minor changes were made to the Proposed RMP Amendments to correct errors and to clarify decisions. Clarifications and corrections made since the Proposed RMP Amendments were published on May 29, 2015 ~~and~~ are hereby adopted by this ROD.

2.4.1 Modifications and Clarifications by Sub-region

Modifications and clarifications are summarized below for each of the sub-regional ARMPAs.

Idaho and Southwestern Montana

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Nevada and Northeastern California

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Oregon

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Utah

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

2.4.2 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed RMPA/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four sub-regional PRMPAs/FEISs.

These decisions are final for the Department of the Interior. With the exception of the granted protest issues, the Director concluded that the BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party will be notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.5.1.

Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Idaho and Southwestern Montana GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Nevada and Northeastern California

For the Nevada and Northeaster California GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Nevada and Northeastern California Sub-Regional GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Oregon

For the Oregon GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Oregon GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Utah

For the Utah GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Utah GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

2.4.3 Governors Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

In some instances, modifications to the Proposed RMP Amendments were addressed based on recommendations submitted to the BLM by the applicable states. These modifications to the ARMPAs are summarized below by sub-region and are now part of the attached ARMPAs.

Idaho and Southwestern Montana

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Nevada and Northeastern California

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Oregon

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Utah

Will need to populate the "X" areas towards the end of the GCR process (end of July).

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a ~~unique~~ set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs influencing land management for the protection and enhancement of ~~Greater Sage-grouse~~GRSG and its habitat. All management under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The alternatives differed in how fast the goals would be met, the degree to which they would be met, the emphasis placed on certain programs and activities, and whether active or passive management would occur.

Comment [KK48]: Does the analysis actually differentiate between alternatives on how fast & to what degree goals would be met? If not, perhaps we don't want to say this. Also, this sentence & the next paragraph seem to be saying the same thing

The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs.

When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives.

Comment [KK49]: These are amendments, so why would we have any decisions not tied to a planning issue – is this more of a revision thing?

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction and prevailing conditions derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments, activity-and implementation-level plans, and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply. ~~Many of the underlying RMPs/MFPs are outdated and~~

Comment [KK50]: What does this mean – that the analysis assumed RFD the same as today?

Comment [KK51]: Really – are there implementation level decisions included in no action?

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the USFWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of~~n~~ standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus~~e~~ on suppression in PHMA and

GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix X, Required Design Features (RDFs), of this document.

Comment [KK52]: Or of each plan – will this be part of each plan appendix or a standalone appendix that each plan appendix references?

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, most management actions in GHMA reverted back to the No Action Alternative, which was found to not meet the purpose and need for the Amendments. Alternative B was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

Comment [KK53]: Might need to explain what this means – it is in all the alternatives we don't choose & I don't know what it means

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below).

Comment [KK54]: I added this. Is this right? What was the withdrawal for?

Alternative C is the most restrictive approach to GRSG conservation. It would eliminate all future ROWs, fluid mineral leasing, nonenergy leasable mineral development, and mineral material sales on GRSG habitat. Alternative C would also recommend withdrawal from locatable mineral entry for all GRSG habitat. It would manage all GRSG habitat as PHMA. This alternative would substantially reduce surface disturbance in all GRSG habitat. Under Alternative C, the BLM would take a passive management approach to vegetation management and fuels treatments. Additionally, all GRSG habitat would be unavailable for livestock grazing.

Comment [KK55]: Seems to be a repeat of last 2 sentences in previous paragraph

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required ~~by best available science from~~to conserve GRSG and its habitats. Alternative C was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which was~~ere~~ identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances ~~that require~~with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while ~~accommodating~~ meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocation decisions were not consistent across the Great Basin. For example, in the Nevada and Northeastern California Proposed Amendment, nonenergy leasable mineral development and mineral material sales would be closed in GHMA, while in the Oregon, Utah, and Idaho and Southwestern Montana Proposed Amendments, these allocations in GHMA were open.

Comment [KK56]: Can we mention those that are consistent? How about, allocations are less stringent, but still aim to protect GRSG habitat, for example through avoidance areas for wind and solar development, but also providing more flexibility from state to state in the Great Basin. Table XX shows a lot of consistency so I don't want this sentence to just hang out there as if we were willy-nilly in our decision making for GHMA.

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem ~~enhancements~~restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative provided by the State or Governor's offices for inclusion and analysis in the EISs. It incorporates guidance from specific State Conservation strategies, if developed, or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

Comment [KK57]: Is this right? – I suggest this because capitalized "State Conservation" implies an actual plan exists, but from the paragraphs below, it seems more like the states made recommendations on how BLM should manage – rather than a statewide, all lands conservation strategy.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. The state plan describes the Oregon Department of Fish and Wildlife's proposed management of GRSG. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

Comment [KK58]: Does this plan include private and state lands or just federal lands?

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, the planning area includes all occupied GRSG habitat in Utah. Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. Alternative E1 was designed to eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected, in whole, as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the ARMPA were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA, while limiting certain types of fuels treatments ~~necessary to protect GRSG habitat~~. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA.

Comment [KK59]: Opinion?

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which is not required by best available science from GRSG and its habitats. Alternative F was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

Comment [KK60]: According to the paragraph above grazing is not closed, but is reduced by 25% - think we need a different example for this alternative

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM has developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focus on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative Considered in all Sub-Regions

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

Alternative C is most protective of resources, specifically GRSG habitat in the planning area and thus would be the most "environmentally preferable" as that term is defined in Question 6A of CEQ's 40 asked questions regarding NEPA, but both NEPA and FLPMA recognize resource uses as part of the policy of the United States and under the standard of FLPMA's multiple-use mandate, the Proposed Plan was determined to be the most balanced.

Comment [KK61]: Repeat of first sentence of previous paragraph?

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- USFWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- USFWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

Utah

- USFWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. MANAGEMENT CONSIDERATIONS

The BLM is tasked to provide multiple use management for public lands by the Federal Land Policy and Management Act (FLPMA) and numerous other laws and regulations that govern the management of public lands. Due to the diversity of community needs and stakeholders affected by management of BLM lands, there has been both support and opposition to certain components of the Proposed Plans. BLM's objective in choosing the Proposed Plan Amendments as the ARMPAs was to address diverse needs and concerns in a fair manner and provide a practical and workable framework for management of public lands in ~~Greater Sage-grouse~~GRSG habitat. The BLM is ultimately responsible for preparing these ARMPAs consistent with its legal mandates that reflect collective professional judgment using the best available science. The ARMPAs provide a balance between those reasonable measures necessary to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat to meet the purpose and need of these plan amendments, and the ongoing public need for use of the public lands within the Great Basin Region planning area.

The ARMPAs were selected because they will reduce or eliminate threats to ~~Greater Sage-Grouse~~GRSG at a landscape scale, improve and sustain properly functioning resource conditions, and consider needs and demands for existing or potential resource commodities and values. In the end, ~~Greater Sage-Grouse~~GRSG habitat will be managed by integrating ecological, economic, and social principles in a manner that safeguards the long term sustainability, diversity and productivity of the land.

In 2012, ~~at~~ the FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations. **Table XX** provides a crosswalk between the threats to GRSG and their habitat identified in the COT Report and the key management responses from the ARMPAs that aim to ameliorate these threats.

Comment [KK62]: I moved Table XX up. It might make sense to reference the new Table A (threats) as well as this Table XX here but we probably don't need much text

~~Table XX~~

~~Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats~~

~~Threats to GRSG and its Habitat (from COT Report)~~	~~Key Management Responses of the Great Basin Region GRSG ARMPAs~~
~~All threats~~	- ~~Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met.~~ - ~~Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat.~~ - ~~Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner.~~ - ~~Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat.~~ - ~~Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat.~~ - ~~Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.~~
~~All development threats, including mining, infrastructure, and energy development.~~	- ~~PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only)~~ - ~~PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)~~
~~Energy development – fluid minerals, including geothermal resources~~	- ~~PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception.~~ - ~~GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)~~
~~Energy development – wind energy~~	- ~~PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas)~~ - ~~GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)~~
~~Energy development – solar energy~~	- ~~PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas)~~ - ~~GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy~~

~~Table XX~~

~~Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats~~

~~Threats to GRSG and its Habitat (from COT Report)~~	**~~Key Management Responses of the Great Basin Region GRSG ARMPAs~~**
	~~development)~~
~~Infrastructure – major ROWs~~	• ~~PHMA: Avoidance area (may be available for major ROWs with special stipulations)~~ • ~~GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)~~
~~Infrastructure – minor ROWs~~	• ~~PHMA: Avoidance area (may be available for minor ROWs with special stipulations)~~
~~Mining – locatable minerals~~	• ~~SFA: Recommend withdrawal from the Mining Law of 1872~~
~~Mining – nonenergy leasable minerals~~	• ~~PHMA: Closed area (not available for nonenergy leasable minerals)~~
~~Mining – salable minerals~~	• ~~PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)~~
~~Livestock grazing~~	• ~~Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA.~~ • ~~The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis.~~ • ~~Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.~~
~~Free-roaming equid management~~	• ~~Prioritize gathers in SFAs, followed by other PHMAs.~~ • ~~Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives.~~ • ~~Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.~~
~~Range management structures~~	• ~~Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats.~~ • ~~Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.~~
~~Recreation~~	• ~~PHMA: Do not construct new recreation facilities unless required for health and safety purposes.~~

~~**Table XX**~~

~~**Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats**~~

~~**Threats to GRSG and its Habitat (from COT Report)**~~	~~**Key Management Responses of the Great Basin Region GRSG ARMPAs**~~
	~~• Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain.~~
~~Fire~~	~~• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection.~~ ~~• Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.~~
~~Nonnative, invasive plant species~~	~~• Improve GRSG habitat by treating annual grasses.~~ ~~• Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.~~
~~Sagebrush removal~~	~~• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover.~~ ~~• All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.~~
~~Pinyon and/or juniper expansion~~	~~• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.~~
~~Agricultural conversion and exurban development~~	~~• GRSG habitat will be retained in federal management.~~

5. MITIGATION MEASURES

In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the GRSG including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the FWS in its 2010 listing decision (75 FR 13910), COT report, and depicted in the ARMPAs' Monitoring Framework (which can be found in Appendix X of each of the attached ARMPAs). Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g. avoid, minimize, and compensate). If impacts from BLM management actions and authorized third-party actions (which are consistent with the goals, objectives, and management actions in the attached ARMPAs) that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation would be durable, timely, and in addition to what would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in the Mitigation Strategy, which can be found in Appendix X of each of the attached ARMPAs).

All practical means to avoid or minimize environmental harm, specifically to ~~Greater Sage-Grouse~~GRSG and its habitat are encompassed in the attached ARMPAs and associated appendices. Mitigation measures, including the application of required design features have been identified.

The ARMPAs also identify the development of regional mitigation strategies, in partnership with the states, to guide and target mitigation to achieve the greatest benefit to GRSG and habitat conservation and restoration. Within 90 days of the issuance of the Record of Decisions, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for actions and third party authorizations that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat. The mitigation strategy will be developed within one year of the issuance of the Record of Decisions.

6. PLAN MONITORING

Comment [KK63]: This currently appears twice – see also 1.5.3 where it is paired with adaptive management.

The BLM's Monitoring framework (Appendix X of each of the attached ARMPAs) describes the process that the BLM will use to monitor implementation and effectiveness of ARMPA decisions. The monitoring framework includes methods, data standards, and intervals of monitoring at broad- and mid-scales; consistent indicators to measure descriptions for each of the scales; analysis and reporting methods; and the incorporation of monitoring results into adaptive management.

The BLM has committed to consistently and systematically monitor the land use plans implementation actions authorized within the designated sage-grouse management areas (e.g., Sagebrush Focal Areas, Priority Habitat Management Areas, General Habitat Management Areas). An annual Implementation Monitoring Report will describe the number and types of authorized actions in each of the sage-grouse management areas and will document whether the authorized actions are in conformance with the applicable land use plan. ~~The reporting structure will be based on the BLM program areas and use the completion date of the decision from the NEPA document in the ePlanning system.~~

Effectiveness monitoring includes monitoring disturbance in habitats, as well as landscape habitat attributes. To monitor habitats, the BLM will measure and track attributes of GRSG habitat management areas at the broad scale, and attributes of habitat availability, patch size, linkage/connectivity habitat, edge effect, and human disturbances at the mid-scale. Disturbance monitoring will measure and track changes in the amount of sagebrush in the landscape and changes in the human footprint, including changes in density of energy development. The framework also includes: (1) methods for analyzing and reporting for field offices, states, and BLM districts; (2) geospatial and tabular data for disturbance mapping (e.g., geospatial footprint of new permitted disturbances) and management action effectiveness.

The monitoring data will also provide the indicator estimates for adaptive management. The BLM will adjust management decisions through an adaptive management process (consistent with and in accordance with applicable law, as described in each of the specific adaptive management strategies outlined in Appendix X of the attached ARMPAs).

Comment [KK64]: What is this? Seems kind of wonky, can we say what we mean. Also, we need to talk more about adaptive management & the triggers – see 1.5.3

7. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

The BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department~~s~~ of the Interior ~~and Agriculture~~ policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date.

7.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Proposed RMP Amendments/FEIS, Idaho and Southwestern Montana conducted seven public meetings~~;~~, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plans. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft EISs' comment periods. Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMP Amendments.

A Notice of Availability (NOA) for the Great Basin Region GRSG Proposed RMP Amendments and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governors' consistency review. Refer to **Section 2.5** for a full description of the protest period and governors' consistency review outcomes.

7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the USFWS and the U.S. Forest Service. In addition, the Great Basin sub-regions' also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 11 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. For a full list of these cooperating agencies divided by sub-region, refer to the Cooperating Agencies List at the beginning of this ROD. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs.

Comment [KK65]: Just in GB or for the whole planning effort? I counted 13 federal agencies (if every state repeat is a separate MOU)

7.2 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the USFWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the USFWS for review. The USFWS evaluated the biological assessments and concurred with the "no affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the threatened listed Utah Prairie Dog. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix X of Attachment X).

[Verify that the above paragraph is applicable to UT once BLM UT hears back from their local FWS.]

7.3 Native American Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

The Draft RMP Amendments/EISs were provided to the Idaho, Montana, Nevada, California, Oregon, and Utah State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMP Amendments/FEISs were also provided to the SHPOs.

[Verify that the above paragraph is applicable to UT.]

8. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. The Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published on May 29, 2015, in the Federal Register (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

I hereby approve the land use plan amendments decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Sally Jewell Secretary Department of the Interior	Date

9. ATTACHMENTS

Appendix A. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix B. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Appendix C. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

PL_PUB_3708
9.1

Internal Draft Document – Do Not Distribute

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana; Nevada and Northeastern California; Oregon; and Utah

Prepared by:

U.S. Department of Interior
Bureau of Land Management
Washington, DC

August 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Cooperating Agencies

Great Basin Region-Wide

US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana

Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California

Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon

Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah

Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emory County
Garfield County
Grand County
Iron County
Kane County
Lincoln County
Miller County
Piute County
Rich County
San Pete County
Sevier County
State of Utah (PLPCO)
Sweetwater County
Sweetwater County Conservation District
Tooele County
Uinta County (UT and WY)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

[Insert BLM WO Letterhead]

In Reply Refer To:
In Reply, Refer to:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah,). The ROD approves the four Great Basin Region ARMPAs, which are part of fifteen other sub-regional RMP Amendments and RMP revisions associated with the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011.

The Bureau of Land Management (BLM) ARMPAs provide a range wide, comprehensive, science-based, collaborative strategy for addressing previously identified threats to the Greater Sage-Grouse (GRSG). This strategy, ~~while~~ designed to address issues leading to the 2010 “warranted but precluded” decision by the U.S. Fish and Wildlife Service (FWS), was guided by over a decade of research, analysis and recommendations for GRSG conservation produced by the Conservation Objectives Team (COT), Western Association of Fish and Wildlife Agencies (WAFWA), the BLM National Technical Team and (NTT). Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and local partners were fundamental during the development of the land use plan decisions within these ARMPAs to address the identified threats to GRSG.

It is important to note that this ROD and these ARMPAs are specific only to BLM-administered lands. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft EISs and Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy Management Act (FLPMA) requires the development and maintenance, and, as appropriate, the revision of land use plans for public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions that could significantly affect the environment. In fulfillment of these requirements, the Draft RMP Amendments/Draft EISs, incorporating analysis and input provided by the public; local, State, and

other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM personnel were published in the fall of 2013. The 90-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 letters that were submitted. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

Comment [KK1]: Are these numbers for just Great Basin or all 15 (14)?

The Proposed RMP Amendments/Final EISs were made available on May 29, 2015, for a 30-day protest period. X protest letters were received, of which X were valid protests in need of resolution. Protest issues are addressed and resolved in the Protest Summary Report, available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

After much consideration, the BLM now approves the ~~Proposed~~ RMP Amendments as the land use planning documents that will guide ~~Greater Sage-Grouse~~GRSG habitat management in the Great Basin Region for the life of the plan amendment.

Copies of the ROD and ARMPAs can be obtained from the BLM's National ~~Greater Sage-Grouse~~GRSG webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, Cooperating Agencies; local, State, and other Federal agencies; and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented and monitored for the conservation of ~~Greater Sage-Grouse~~GRSG and their habitat.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

The Federal Land Policy and Management Act of 1976 as amended (FLPMA) directs the United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) to develop and periodically revise or amend its resource management plans (RMPs), which guide management of BLM-administered lands.

Comment [KK2]: Is this necessary?

The ROD and ARMPAs for the Great Basin Region GRSG Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon,~~;~~ and Utah provides a layered management approach that offers the highest level of protection for Greater Sage-Grouse (GRSG) in the most valuable habitat to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team report. Land use allocations in the ARMPAs ~~would~~ limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs ~~would~~ implement a suite of management tools, such as disturbance limits, GRSG habitat objectives and monitoring, mitigation approaches, adaptive management triggers and responses, and other protective measures throughout the range. These overlapping and reinforcing conservation measures ~~would~~ work in concert to improve and restore GRSG habitat condition and provide consistency in how the BLM manages activities in GRSG habitat in the Great Basin Region.

Table of Contents

Dear Reader Letter

Summary

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached approved Resource Management Plans (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM~~-~~administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) as amended and other applicable laws. The BLM prepared environmental impact statements (EISs) in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

Comment [KK3]: Either ROD & BLM carry from the dear readers letter or all acronyms need to be redefined here.

Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft EISs and Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

1.1 National Greater Sage-Grouse Planning Strategy

In March 2010, the US Fish and Wildlife Service (USFWS) published their 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, a species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM and Forest Service as conservation measures in land use plans.

Consistent with the National GRSG Planning Strategy, the BLM as the lead agency, together with the U.S. Forest Service as a cooperating agency, prepared 15 environmental impact statements (EISs), with associated plan amendments and revisions. These documents provide a set of management alternatives focused on specific conservation measures across the range of the GRSG (see **Figure X**, National Greater Sage-Grouse Planning Strategy Boundaries) to address the threats identified in the 2010 USFWS "warranted but precluded" decision.~~.~~

Comment [KK4]: Could include table showing threats by population in this section (LR Table A)

[Insert Figure X here.]

Science-based decision-making and collaboration with state and local partners were fundamental to the National GRSG Planning Strategy. The 17 ARMPAs and ARMPs address threats to GRSG identified by state fish and wildlife agencies, the BLM National Technical Team (NTT), and the USFWS in the context of its listing decision and the Conservation Objectives Team (COT) report.

Comment [KK5]: 15?

The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed A Report on National Greater Sage-Grouse Conservation Measures in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of~~n~~ standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

Comment [KK6]: Were they on NTT?

In 2012, FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the ~~greater sage-grouse~~GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the ~~greater sage-grouse's~~GRSG's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations.
http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the ARMPAs.

The BLM also adopted unique state and stakeholder developed approaches and priorities within the ARMPAs. In 2011, then Secretary of the Interior Ken Salazar sent letters to each of the sage-grouse state governors asking for a report and recommendations on how to best move forward with a multi-state conservation sage-grouse plan. Most states across the range provided state conservation plans that were part of the range of alternatives analyzed in the Final EISs. Components of these state conservation plans were used to develop the ARMPAs.

In addition, the Western Governors Association Sage Grouse Task Force was established in 2011 to identify and implement high priority conservation actions and integrate ongoing actions necessary to preclude the need for the GRSG to be listed under the ESA. This group, which includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, US Forest Service, US Geological Survey, and the Department of the Interior, played an integral role throughout this land use planning process.

1.2 Ameliorating Threats to the Greater Sage-Grouse through the National Greater Sage-Grouse Planning Strategy

[Need to verify with Jim and Karen what elements from the Landscape Report they would like to see here. Right now, we only included content from Section VII (Summary) of the Landscape Report, but we can change this if needed. We can even include some of the pie charts and figures from the LR if necessary.]

The product of the National GRSG Planning Strategy, the four Great Basin ARMPAs and 13 ARMPAs/ARMPs in the Rocky Mountain Region, are an essential component of the effort to conserve GRSG and obviate a listing of the species under ESA. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain updated land use plan direction on nearly 60 percent of the remaining habitat for the species. These ARMPAs/ARMPs are the product of extensive coordination, including the active engagement of the USFWS in helping to inform land allocation and related management decisions by the BLM. They also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, and circumstances in each.

Comment [KK7]: The numbers that I received from Stephanie most recently are more like 50%

This section highlights the major components that are presented in the attached ARMPAs that were constructed to address the specific threats to the viability of the GRSG, as identified in the USFWS 2010 listing decision and COT Report (many of which were also identified by the BLM's NTT Report).

Land Allocations

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT recommended an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

In response, the four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA included the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil, gas, and geothermal reserves in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region. To benefit GRSG conservation efforts and to assist developers in reducing the time and cost associated with oil and gas leasing development, the BLM will encourage new leasing in areas outside of PHMAs, and GHMAs.

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Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in PHMAs for non-energy leasable minerals and saleable minerals. An exception is granted for free use permits and the expansion of existing active pits for mineral material sales and expansion of existing non-energy leasable development. There is no potential for coal development in the Great Basin outside of Utah. In Utah, at the time of a new coal lease or lease modification, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are "essential habitat" for purposes of suitability determinations.

In all PHMA in the Great Basin Region, new rights of way and development for transmission lines, pipelines, and related infrastructure will be avoided through restrictions on land use authorizations. Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless necessary for health and safety purposes.

Renewable energy development (solar and wind) is excluded in PHMAs in the four Great Basin ARMPAs, with the exception of a few counties in southeastern Oregon where an avoidance allocation is applied.

In general, all forms of new development would be excluded, avoided, or developed only if the resultant effect is a net conservation benefit to the GRSG or its habitat. In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation benefit for the GRSG.
While the majority of compelling restrictions are placed in PHMA, restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation. However, any disturbance is subject to mitigation and should seek to first avoid and then minimize any impacts to GRSG or its habitat, while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species.

An added element of habitat protection was provided for GRSG strongholds in the ARMPAs by identifying Sagebrush Focal Areas (SFAs), a subset of PHMAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memo from FWS Director Ashe to BLM Director Kornze and Forest Service Chief Tidwell in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection"(http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf). Beyond that in PHMA, management decisions to be applied to SFAs include NSO stipulation with no exceptions for oil, gas, and geothermal development; recommendation that these areas be withdrawn by the Secretary from mineral entry under the 1872 Mining Act, and prioritizing grazing permit renewal, wildhorse and burro management, and vegetation management. While the SFAs have minimal land surface disturbance and, based on existing, available data, limited mineral potential, valid existing rights – as in all habitat – will be recognized and be able to proceed in accordance with their legal rights.

Management Direction, Prioritization, and Mitigation

In addition to land allocations to protect SFAs, PHMAs, and GHMAs, the ARMPAs guide other uses of these landscapes to meet COT objectives consistent with existing, authorized uses of GRSG habitats and the sagebrush landscape.

Grazing is the most widespread use of the sagebrush steppe ecosystem in the Great Basin states. The COT Report recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the four Great Basin ARMPAs require the incorporation of GRSG seasonal habitat objectives into grazing permits, consistent with the ecological site potential of the local areas.

The Great Basin ARMPAs place a priority on completing land heath assessments in SFAs, then PHMAs and GHMAs. The assessments will evaluate if grazing standards and guidelines are met, ensure that GRSG seasonal habitat objectives are also being met or are making progress towards being met, and ensure that the GRSG seasonal habitat objectives are incorporated into grazing permits.

Direction in the AR~~A~~MPAs also incorporates GRSG seasonal habitat objectives into establishment of allowable management levels (AMLs). Prioritization of horse gathers and removal to reach AMLs in SFAs, PHMAs, and GHMAs (in that order) will be conducted.

Fire represents the greatest threat to sage-grouse habitat in the Great Basin Region. Recognizing the nature and extent of this threat, the ARMPAs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire. The four ARMPAs include specific guidance for fire prevention and the restoration of lands impacted by fire. The Great Basin ARMPAs also provide for a more aggressive, targeted effort to prevent and suppress fires that could impact thousands of acres of sage-grouse habitat, as well as restore areas with high potential to survive the impacts of climate change and subsequent rangeland fires.

Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of three priority lines has been underway for a number of years. These lines are critical to expanding access to renewable sources of energy and to improving the reliability of the Western grid. For these reasons, planning for these lines will proceed and potential impacts to GRSG will be fully mitigated through the mitigation identified in the site-specific NEPA for those projects.

Lek protection

In addition to land allocations and management actions included in the Great Basin ARMPAs to conserve the GRSG, additional measures were included to ensure that disturbance to leks could be reduced or minimized through the application of disturbance caps and required minimum buffers.

Disturbance caps of 3% in PHMA were established in accordance with recommendations contained in the NTT and COT reports. Disturbance will be calculated based on established Biologically Significant Units developed by interagency teams for each of the four sub-regional planning efforts in the Great Basin, as well as at the proposed project scale analysis area, and will include proximity to leks in the calculation.

The ARMPAs provide direction to apply and analyze lek buffer-distances in PHMA and GHMA as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate

Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy,* the BLM conservation strategy places heavy reliance on monitoring and evaluation to assess the success of management decisions incorporated in ARMPAs, ultimately, in the effectiveness of implementing these plans. Monitoring plans will be interagency in nature and incorporate evaluation of greater sage-grouse population trends by the states and changes in habitat condition by the Federal land management agencies.

In addition, the conservation strategy incorporates an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should declines in population levels or habitat conditions occur. If management responses to soft triggers do not adequately address the causes for population or habitat declines and "hard triggers" are reached, more significant changes in management actions and land allocations will immediately be implemented to conserve the species.

1.3 Great Basin Region Planning Area

One of two regions that make up the National Greater Sage-Grouse Planning Strategy, the Great Basin Region is composed of four sub-regions, which include the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure X** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) analyses were conducted, ~~separately~~ one for each sub-region. These sub-regional boundaries were generally developed based on the identified threats to the GRSG and the Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones. Seven WAFWA Management Zones across the west were delineated in the *WAWFA 2006 Greater Sage-Grouse Comprehensive Strategy*. These large polygons were based on similar sage-grouse populations and sub-populations identified within seven floristic provinces.

The Great Basin Region consists of WAFWA Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin). The USFWS has identified a number of threats in this region, focusing on the present and widespread threats of wildfire, loss of native habitat to invasive species, and habitat fragmentation. Other threats, many of which are more localized by nature, include anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization, sagebrush elimination, as well as disturbance associated with free-roaming equids and livestock grazing.

The Great Basin Region planning area boundaries included all lands regardless of jurisdiction (see **Figure X** - Great Basin Region Planning Area - Greater Sage-Grouse Habitat Management Areas). **Table X** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

GRSG habitat management areas on BLM-administered lands in the decision area consists of lands allocated as Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table X** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.
- **GHMA**— BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft LUPA/EIS.
- **OHMA** —BLM-administered lands identified as unmapped habitat in the Draft LUPA/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse

Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.

- **IHMA** —BLM-administered lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. There are no IHMAs designated within southwestern Montana. The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the Proposed Plan.

The Great Basin Region ARMPAs also identify specific Sagebrush Focal Areas (SFAs), which are allocations that are a subset of PHMA (see **Figure X** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). The SFAs were derived from GRSG stronghold areas described in a USFWS memorandum to the BLM titled Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes (USFWS 2014). The memorandum and associated maps provided by the USFWS identify areas that represent recognized strongholds for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species.

Table X
Land Management in the Great Basin Planning Area

Surface Land Management	NV/NE CA	ID/SW MT	Utah	Oregon	Great Basin Total
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,975,500**
USFWS	805,900	121,900	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,200**	**48,209,900**	**31,656,300**	**194,208,300**

Source: BLM GIS 2015

Table X
Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600

Table X
Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Utah	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

[Figure X & Figure X will be inserted here once NOC has completed them.]

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments A, B, C, and D). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed. No further administrative remedies are available for these land use plan decisions.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in Sections 1.1 of attachments A, B, C, and D. This ROD and ARMPAs become effective on the date this ROD is signed. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

The land use decisions provide conservation measures to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and~~,~~ objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses
- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not for certain uses. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Comment [KK8]: They are also places where we will prioritize certain conservation and restoration management actions . . . .

Management actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands, including but not limited to stipulations, guidelines, best management practices (BMPs), and required design features.

Comment [KK9]: Really, we are considing BMPs protestable RMP-level decisions?

The ARMPAs' management decisions were crafted to alleviate identified threats to ~~Greater Sage-grouse~~GRSG and their habitats (see **Section 1.X**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not affect valid existing rights.

The ARMPAs do not contain decisions for the mineral estates of lands located in the planning area for lands under the jurisdiction of other Federal agencies such as the Forest Service, or for private or State-owned lands and minerals that are not administered by the BLM. ARMPA decisions for surface estate only apply to BLM managed lands. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

Comment [KK10]: This is a "what the ROD & ARMPA does provide" not what it doesn't – and it would be helpful to have the same "what the subsurface decisions do apply to" sentence.

- *Statutory requirements.* The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy.* The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

During preparation of the ARMPAs for all four sub-regions, minor changes were made to the Proposed RMP Amendments to correct errors and to clarify decisions. Clarifications and corrections made since the Proposed RMP Amendments were published on May 29, 2015 ~~and~~ are hereby adopted by this ROD.

2.4.1 Modifications and Clarifications by Sub-region

Modifications and clarifications are summarized below for each of the sub-regional ARMPAs.

Idaho and Southwestern Montana

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Nevada and Northeastern California

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Oregon

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Utah

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

2.4.2 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed RMPA/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four sub-regional PRMPAs/FEISs.

These decisions are final for the Department of the Interior. With the exception of the granted protest issues, the Director concluded that the BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party will be notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.5.1.

Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Idaho and Southwestern Montana GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Nevada and Northeastern California

For the Nevada and Northeaster California GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Nevada and Northeastern California Sub-Regional GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Oregon

For the Oregon GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Oregon GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Utah

For the Utah GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Utah GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

2.4.3 Governors Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

In some instances, modifications to the Proposed RMP Amendments were addressed based on recommendations submitted to the BLM by the applicable states. These modifications to the ARMPAs are summarized below by sub-region and are now part of the attached ARMPAs.

Idaho and Southwestern Montana

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Nevada and Northeastern California

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Oregon

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Utah

Will need to populate the "X" areas towards the end of the GCR process (end of July).

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a ~~unique~~ set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs influencing land management for the protection and enhancement of ~~Greater Sage-grouse~~GRSG and its habitat. All management under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The alternatives differed in how fast the goals would be met, the degree to which they would be met, the emphasis placed on certain programs and activities, and whether active or passive management would occur.

Comment [KK11]: Does the analysis actually differentiate between alternatives on how fast & to what degree goals would be met? If not, perhaps we don't want to say this. Also, this sentence & the next paragraph seem to be saying the same thing

The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives.

Comment [KK12]: These are amendments, so why would we have any decisions not tied to a planning issue – is this more of a revision thing?

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction and prevailing conditions derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments, activity-and implementation-level plans, and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply. ~~Many of the underlying RMPs/MFPs are outdated and~~

Comment [KK13]: What does this mean – that the analysis assumed RFD the same as today?

Comment [KK14]: Really – are their implementation level decisions included in no action?

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the USFWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of~~n~~ standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus~~e~~ on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix X, Required Design Features (RDFs), of this document.

Comment [KK15]: Or of each plan – will this be part of each plan appendix or a standalone appendix that each plan appendix references?

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, most management actions in GHMA reverted back to the No Action Alternative, which was found to not meet the purpose and need for the Amendments. Alternative B was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

Comment [KK16]: Might need to explain what this means

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable minerals, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below).

Comment [KK17]: Is this right? What was the withdrawal for?

Alternative C is the most restrictive approach to GRSG conservation. It would eliminate all future ROWs, fluid mineral leasing, nonenergy leasable mineral development, and mineral material sales on GRSG habitat. Alternative C would also recommend withdrawal from locatable mineral entry for all GRSG habitat. It would manage all GRSG habitat as PHMA. This alternative would substantially reduce surface disturbance in all GRSG habitat. Under Alternative C, the BLM would take a passive management approach to vegetation management and fuels treatments. Additionally, all GRSG habitat would be unavailable for livestock grazing.

Comment [KK18]: Seems to be a repeat of last 2 sentences in previous paragraph

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required ~~by best available science from~~to conserve GRSG and its habitats. Alternative C was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which was~~ere~~ identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances ~~that require~~with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while ~~accommodating~~ meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocation decisions were not consistent across the Great Basin. For example, in the Nevada and Northeastern California Proposed Amendment, nonenergy leasable mineral development and mineral material sales would be closed in GHMA, while in the Oregon, Utah, and Idaho and Southwestern Montana Proposed Amendments, these allocations in GHMA were open.

Comment [KK19]: Can we mention those that are consistent? How about, allocations are less stringent, but still aim to protect GRSG habitat, for example through avoidance areas for wind and solar development, but also providing more flexibility from state to state in the Great Basin.

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem ~~enhancements~~restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative provided by the State or Governor's offices for inclusion and analysis in the EISs. It incorporates guidance from specific State Conservation strategies, if developed, or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

Comment [KK20]: Is this right? – I suggest this because capitalized "State Conservation" implies an actual plan exists, but from the paragraphs below, it seems more like the states made recommendations on how BLM should manage – rather than a statewide, all lands conservation strategy.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. The state plan describes the Oregon Department of Fish and Wildlife's proposed management of GRSG. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

Comment [KK21]: Does this plan include private and state lands or just federal lands?

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, the planning area includes all occupied GRSG habitat in Utah. Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. Alternative E1 was designed to eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected, in whole, as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the ARMPA were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA, while limiting certain types of fuels treatments ~~necessary to protect GRSG habitat~~. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA.

Comment [KK22]: Opinion?

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which is not required by best available science from GRSG and its habitats. Alternative F was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

Comment [KK23]: According to the paragraph above grazing is not closed, but is reduced by 25% - think we need a different example for this alternative

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM has developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focus on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative Considered in all Sub-Regions

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

Alternative C is most protective of resources, specifically GRSG habitat in the planning area and thus would be the most "environmentally preferable" as that term is defined in Question 6A of CEQ's 40 asked questions regarding NEPA, but both NEPA and FLPMA recognize resource uses as part of the policy of the United States and under the standard of FLPMA's multiple-use mandate, the Proposed Plan was determined to be the most balanced.

Comment [KK24]: Repeat of first sentence of previous paragraph?

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- USFWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- USFWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

Utah

- USFWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives

- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. MANAGEMENT CONSIDERATIONS

The BLM is tasked to provide multiple use management for public lands by the Federal Land Policy and Management Act (FLPMA) and numerous other laws and regulations that govern the management of public lands. Due to the diversity of community needs and stakeholders affected by management of BLM lands, there has been both support and opposition to certain components of the Proposed Plans. BLM's objective in choosing the Proposed Plan Amendments as the ARMPAs was to address diverse needs and concerns in a fair manner and provide a practical and workable framework for management of public lands in ~~Greater Sage-grouse~~GRSG habitat. The BLM is ultimately responsible for preparing these ARMPAs consistent with its legal mandates that reflect collective professional judgment using the best available science. The ARMPAs provide a balance between those reasonable measures necessary to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat to meet the purpose and need of these plan amendments, and the ongoing public need for use of the public lands within the Great Basin Region planning area.

The ARMPAs were selected because they will reduce or eliminate threats to ~~Greater Sage-Grouse~~GRSG at a landscape scale, improve and sustain properly functioning resource conditions, and consider needs and demands for existing or potential resource commodities and values. In the end, ~~Greater Sage-Grouse~~GRSG habitat will be managed by integrating ecological, economic, and social principles in a manner that safeguards the long term sustainability, diversity and productivity of the land.

In 2012, ~~at~~ the FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations. **Table XX** provides a crosswalk between the threats to GRSG and their habitat identified in the COT Report and the key management responses from the ARMPAs that aim to ameliorate these threats.

Table XX
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Comment [KK25]: MOVE TO AMELIORATING THREATS SECTION 12.-1.3?

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs

Table XX

Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Comment [KK25]: MOVE TO AMELIORATING THREATS SECTION 12.-1.3?

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development.	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) • PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)
Energy development—fluid minerals, including geothermal resources	• PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy development)

Table XX

Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Comment [KK25]: MOVE TO AMELIORATING THREATS SECTION 12.-1.3?

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals)
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. • Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.
Recreation	• PHMA: Do not construct new recreation facilities unless required for health and safety purposes. • Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain.

Table XX

Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Comment [KK25]: MOVE TO AMELIORATING THREATS SECTION 12.-1.3?

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	• GRSG habitat will be retained in federal management.

5. MITIGATION MEASURES

In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the GRSG including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the FWS in its 2010 listing decision (75 FR 13910), COT report, and depicted in the ARMPAs' Monitoring Framework (which can be found in Appendix X of each of the attached ARMPAs). Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g. avoid, minimize, and compensate). If impacts from BLM management actions and authorized third-party actions (which are consistent with the goals, objectives, and management actions in the attached ARMPAs) that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation would be durable, timely, and in addition to what would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in the Mitigation Strategy, which can be found in Appendix X of each of the attached ARMPAs).

All practical means to avoid or minimize environmental harm, specifically to ~~Greater Sage-Grouse~~GRSG and its habitat are encompassed in the attached ARMPAs and associated appendices. Mitigation measures, including the application of required design features have been identified. The ARMPAs also identify the development of regional mitigation strategies, in partnership with the states, to guide and target mitigation to achieve the greatest benefit to GRSG and habitat conservation and restoration.

6. PLAN MONITORING

The BLM's Monitoring framework (Appendix X of each of the attached ARMPAs) describes the process that the BLM will use to monitor implementation and effectiveness of ARMPA decisions. The monitoring framework includes methods, data standards, and intervals of monitoring at broad- and mid-scales; consistent indicators to measure descriptions for each of the scales; analysis and reporting methods; and the incorporation of monitoring results into adaptive management.

The BLM has committed to consistently and systematically monitor the land use plans implementation actions authorized within the designated sage-grouse management areas (e.g., Sagebrush Focal Areas, Priority Habitat Management Areas, General Habitat Management Areas). An annual Implementation Monitoring Report will describe the number and types of authorized actions in each of the sage-grouse management areas and will document whether the authorized actions are in conformance with the applicable land use plan. ~~The reporting structure will be based on the BLM program areas and use the completion date of the decision from the NEPA document in the ePlanning system.~~

Effectiveness monitoring includes monitoring disturbance in habitats, as well as landscape habitat attributes. To monitor habitats, the BLM will measure and track attributes of GRSG habitat management areas at the broad scale, and attributes of habitat availability, patch size, linkage/connectivity habitat, edge effect, and human disturbances at the mid-scale. Disturbance monitoring will measure and track changes in the amount of sagebrush in the landscape and changes in the human footprint, including changes in density of energy development. The framework also includes: (1) methods for analyzing and reporting for field offices, states, and BLM districts; (2) geospatial and tabular data for disturbance mapping (e.g., geospatial footprint of new permitted disturbances) and management action effectiveness.

The monitoring data will also provide the indicator estimates for adaptive management. The BLM will adjust management decisions through an adaptive management process (consistent with and in accordance with applicable law, as described in each of the specific adaptive management strategies outlined in Appendix X of the attached ARMPAs).

Comment [KK26]: What is this?

7. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

The BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department~~s~~ of the Interior ~~and Agriculture~~ policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning

bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date.

7.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Proposed RMP Amendments/FEIS, Idaho and Southwestern Montana conducted seven public meetings,~~;~~ Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plans. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft EISs' comment periods. Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMP Amendments.

A Notice of Availability (NOA) for the Great Basin Region GRSG Proposed RMP Amendments and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governors' consistency review. Refer to **Section 2.5** for a full description of the protest period and governors' consistency review outcomes.

7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the USFWS and the U.S. Forest Service. In addition, the Great Basin sub-regions' also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 11 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. For a full list of these cooperating agencies divided by sub-region, refer to the Cooperating Agencies List at the beginning of this ROD. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs.

Comment [KK27]: Just in GB or for the whole planning effort? I counted 13 federal agencies (if every state repeat is a separate MOU)

7.2 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the USFWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the USFWS for review. The USFWS evaluated the biological assessments and concurred with the "no affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the threatened listed Utah Prairie Dog. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix X of Attachment X).

[Verify that the above paragraph is applicable to UT once BLM UT hears back from their local FWS.]

7.3 Native American Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts

related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

The Draft RMP Amendments/EISs were provided to the Idaho, Montana, Nevada, California, Oregon, and Utah State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMP Amendments/FEISs were also provided to the SHPOs.

[Verify that the above paragraph is applicable to UT.]

8. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. The Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published on May 29, 2015, in the Federal Register (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

I hereby approve the land use plan amendments decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Sally Jewell Secretary Department of the Interior	Date

9. ATTACHMENTS

Appendix A. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix B. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Appendix C. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

Internal Draft Document – Do Not Distribute

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana; Nevada and Northeastern California; Oregon; and Utah

Prepared by:

U.S. Department of Interior
Bureau of Land Management
Washington, DC

September 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Cooperating Agencies

Great Basin Region-Wide

US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana

Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor’s Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California

Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon

Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah

Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emory County
Garfield County
Grand County
Iron County
Kane County
Lincoln County
Miller County
Piute County
Rich County
San Pete County
Sevier County
State of Utah (PLPCO)
Sweetwater County
Sweetwater County Conservation District
Tooele County
Uinta County (UT and WY)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

[Insert BLM WO Letterhead]

In Reply Refer To:
In Reply, Refer to:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). The ROD approves the four Great Basin Region ARMPAs, which are part of seventeen other sub-regional RMP Amendments and RMP revisions associated with the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011.

The Bureau of Land Management (BLM) ARMPAs provide a range wide, comprehensive, science-based, collaborative strategy for addressing previously identified threats to the greater sage-grouse (GRSG) and its habitat. This strategy, while designed to address issues leading to the U.S. Fish and Wildlife Service's (FWS) 2010 "warranted but precluded" decision, was guided by over a decade of research, analysis and recommendations for GRSG conservation produced by the Conservation Objectives Team (COT) Report and the BLM National Technical Team and (NTT). Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and other partners were fundamental during the development of ~~the land use plan decisions within~~ these ARMPAs to address the identified threats to GRSG.

Comment [GSD1]: FWS does not capitalize and neither does the Dept in our materials . . .

Comment [MEM2]: Caps is consistent with other BLM planning docs and our tech. guide. May need to discuss.

Comment [KK3]: Culminating in? – COT & NTT didn't really produce the decade of research, and analysis; or ". . . guided by over a decade of research for GRSG conservation and analysis and recommendations provided by the COT . . ."

It is important to note that this ROD and these ARMPAs are specific only to BLM administered lands. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy Management Act (FLPMA) requires the development and maintenance, and, as appropriate, the revision of land use plans for public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions that could significantly affect the environment. In fulfillment of these requirements, the Draft RMP Amendments/Draft EISs incorporating analysis and input provided by the public; local, State, and

other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM personnel were published in the fall of 2013. The 90-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 letters that were submitted. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

The Proposed RMPAs/Final EISs were made available on May 29, 2015, for a 60-day governor's consistency review and 30-day protest period. The BLM received consistency review letters from X and has worked closely with these states to resolve these inconsistencies. X protest letters were received, of which X were valid protests in need of resolution. Protest issues are addressed and resolved in the Protest Summary Report, available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

After much consideration, the BLM now approves the attached ARMPAs as the land use planning documents that will guide greater sage-grouse habitat management in the Great Basin Region for the life of the plan amendment for the benefit of GRSG and over 350 other species of wildlife as well as many other land uses, like grazing and recreation, that depend on ~~a~~ healthy sagebrush-steppe landscapes.

Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, Cooperating Agencies; local, State, and other Federal agencies; and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented and monitored for the conservation of Greater sage-grouse and their habitat.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This Record of Decision (ROD) is the culmination of an unprecedented effort in public land management to meet the multiple-use and sustained-yield management objectives for public lands administered by the Bureau of Land Management (BLM) in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA).

In response to a 2010 determination by the U.S. Fish and Wildlife Service (FWS) that the greater sage-grouse listing under the Endangered Species Act (ESA) is "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service), has developed a targeted, multi-tiered, landscape-level management approach, based on the best available science, that offers the highest level of protection for Greater Sage-Grouse (GRSG) in the most important habitat areas to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team (COT) report.

This Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon; and Utah includes land use allocations in the ARMPAs that limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs implement a suite of management actions, such as the establishment of disturbance limits, GRSG habitat objectives, mitigation requirements, monitoring protocols, and adaptive management triggers and responses, as well as other conservation measures throughout the range. The cumulative effect of these conservation measures work in concert to protect, improve, and restore GRSG habitat across the remaining range of the species in the Great Basin and provide greater certainty that BLM land and resource management activities in GRSG habitat in the Great

Basin Region can lead to conservation of the GRSG and other sagebrush-steppe associated species in the region.

The targeted land use plan protections presented in this ROD and ARMPAs do not only protect the greater sage-grouse and their habitat, but also the over 350 wildlife species that call the sagebrush-steppe ecosystem home. Reversing the slow degradation of this valuable ecosystem will also benefit local rural economies and a variety of rangeland uses ranging from recreation to grazing and energy development, in a manner that safeguards the long term sustainability, diversity and productivity of the land.

This conservation strategy, developed in collaboration with the 11 states in which the ARMPAs and ARMPs apply, in addition to other state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna, in order to "conserve the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT report. 2014]

Comment [KK4]: It is hard to understand how energy development is benefitted by reversing the degradation of the sagebrush-steppe ecosystem – what is our rationale for this statement?

Comment [GSD5]: We may want to add some language at the end here from the rollout materials about targeted protections that benefit GRSG, 350+ other species as well as economic activity that depends on a healthy range.

Comment [MEM6]: Added this last paragraph based on Sarah G's suggestion. Will this work or should we flesh out more?

Table of Contents

Dear Reader Letter

Summary

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.), BLM planning regulations (43 Code of Federal Regulations [CFR] §1601 *et seq*.), and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA) and the Council on Environmental Quality's Regulations for implementing the procedural provisions of NEPA (40 CFR §1500.1 *et seq*.).

Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

1.1 Great Basin Region Planning Area

The Great Basin Region is composed of four sub-regions, the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure 1-1** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) documents were prepared for each of these sub-regions. Each sub-region conducted its own planning effort with input from local cooperators, stakeholders, and members of the public. The sub-regional boundaries were constructed to align with BLM administrative offices, state boundaries, as well as areas that shared common threats to the GRSG and their habitat.

Comment [KK7]: We could add the WAFWA zones here as one additional element used to make the region/subregion boundaries??

[Insert **Figure 1-1** - Great Basin Region Greater Sage-Grouse Sub-regions]

The Great Basin Region planning area boundaries include all lands regardless of jurisdiction (see **Figure 1-2** - Great Basin Region Planning Area, Greater Sage-Grouse Habitat Management Areas). **Table 1-1** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.

[Insert **Figure 1-2** - Great Basin Region Planning Area, Greater Sage-Grouse Habitat Management Areas]

Table 1-1
Land Management in the Great Basin Planning Area

Surface Land Management	NV/NE CA	ID/SW MT	Utah	Oregon	Great Basin Total

BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,975,500**
USFWS	805,900	121,900	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,200**	**48,209,900**	**31,656,300**	**194,208,300**

Source: BLM GIS 2015

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure 1-3** - Great Basin Region Decision Area , Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

[Insert **Figure 1-3** - Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas]

1.2 Threats to Greater Sage-Grouse

Currently, GRSG occupy an area that has been estimated to be a reduction of 44% from the historically occupied range. In addition, populations in most or all the range have been demonstrated to have declined from 1965- 2003, the period where data was collected most intensively.

The decline of the GRSG and its sagebrush-steppe habitat has been the focus of fish and wildlife agency and conservationists' concerns for decades. In 1994 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of GRSG. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of GRSG population losses and degradation of sagebrush ecosystems in order to: 1) Maintain the present distribution of GRSG and 2) Maintain the present abundance of GRSG. In 1999 WAFWA amended the objectives to: 1) Maintain and increase where possible the present distribution of GRSG and 2) Maintain and increase where possible the present abundance of GRSG. The Bureau of Land Management, USFWS, and U.S. Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000.

Between May 1999 and December 2003, eight petitions were filed with the U.S. Fish and Wildlife Service (USFWS) to have sage-grouse protected under provisions of the Endangered Species Act (ESA). In 2001 the USFWS determined that greater sage-grouse in the Columbia Basin of Washington state warranted protection under provisions of the ESA. On January 12, 2005, the FWS issued a decision that listing the GRSG for protection under the ESA was not warranted. However, in response to July 14, 2006 Western Watersheds Project filing alleging that the FWS 2005 finding was incorrect and arbitrary, the U.S. District Court of Idaho ruled that the 2005 finding was "arbitrary and capricious" and remanded it to the FWS for further consideration. Ultimately, as a result, in 2010 the FWS issued a finding that listing of the Greater sage-grouse was "warranted but precluded". Subsequent to that finding and in accordance with a settlement agreement [details?] the FWS committed to make a final determination regarding the need to list the GRSG by September 30, 2015. Two factors led to the FWS decision to list the species as "warranted but precluded": threats to habitat and the inadequacy of existing regulatory mechanisms.

The USFWS has identified a number of threats to GRSG in the Great Basin Region, focusing on the present and widespread threats of wildfire and the loss of native habitat to invasive species. Other threats, some of which are more localized by nature, include habitat fragmentation due to anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization and sagebrush elimination, as well as disturbance associated with free-roaming equids and improper livestock grazing.

Additional information regarding potential threats to the GRSG is contained in the BLM National Technical Team (NTT) report and the Conservation Objectives Team (COT) reports. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as articulated in the COT report – is summarized in **Table 1-2**.

In addition, the FWS found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM, which manages more than 40 percent of the remaining habitat range wide, regulatory mechanisms are the agency's Resource Management Plans (RMPs).

The BLM initiated this planning effort with the U.S. Forest Service to provide the needed federal regulatory mechanisms to address the individual threats listed in Table 1-3. This ROD approves the BLM's attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPAs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM- administered lands. ~~The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).~~

Comment [KK8]: I'm inclined to delete this as unneeded here

Comment [KK9]: Already in the 1st paragraph of the intro

Table 1-2. Threats to GRSG in the Great Basin Region (Utah) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan**
Rich-Morgan-Summit (UT)	9b				Y	Y	Y	Y		Y			Y	Y	Utah
Uintah (UT)	9c				Y	Y	Y	L	Y	Y			Y	Y	Utah
Strawberry Valley (UT)	10a	Y			Y	Y	Y	Y		Y			Y		Utah
Carbon (UT)	10b	Y			Y		Y	Y	Y	Y			Y		Utah
Sheeprock Mountains (UT)	11	Y			Y	L	L	Y	Y	L		Y	L		Utah
Emery (UT)	12	Y			Y	Y	Y	Y	Y	Y			Y		Utah
Greater Parker Mountain (UT)	13a				Y	Y	Y			Y			Y		Utah
Panguitch (UT)	13b			Y	Y	Y	Y	Y	L	Y			Y	L	Utah
Bald Hills (UT)	13c	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Utah
Ibapah (UT)	15a	Y			Y	Y	Y	Y	Y	Y		Y	Y		Utah
Hamlin Valley (UT)	15b	Y			Y	Y	Y			Y		Y	Y		Utah
Box Elder (UT)	26b			Y	Y	Y	Y	L	Y	Y			Y		Utah

Table 1-2. (cont.) Threats to GRSG in the Great Basin Region (OR, CA, NV, ID, SWMT) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan(s)**
N. Great Basin (OR, ID, NV)	26a		L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	ID/SW MT, OR, NV/CA
Baker (OR)	17	Y	Y	Y	Y	L	Y	L	Y	L	U		L	L	OR
Central Oregon (OR)	28		L	L	Y	Y	Y	L	Y	L	Y	U	L	L	OR
W. Great Basin (OR, CA, NV)	31		L	L	Y	Y	Y	L	L	L	Y	Y	U		OR, NV/CA
Klamath (CA)	29	Y	U	U	Y	Y	Y	L		U	U	U	U	U	NV/CA
Northwest Interior (NV)	14	Y			Y		Y	U	Y	Y	Y	Y	Y		NV/CA
Southern Great Basin (NV)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y		NV/CA
Quinn Canyon Range (NV)	16	Y			Y	Y	Y			Y	Y	Y	Y		NV/CA
Warm Springs Valley (NV)	30	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	NV/CA
East Central (ID)	18	Y	L	Y	L	Y	L	Y		Y	Y		L		ID/SW MT
Snake-Salmon-Beaverhead (ID)	23		L	L	Y	L	Y	Y		L	Y	Y	L		ID/SW MT
Weiser (ID)	25	Y	L	L	L	L	Y	Y		L	Y		L	L	ID/SW MT
Sawtooth (ID)	27	Y	L		L	U	L			Y	Y		L		ID/SW MT
Southwest Montana (MT)	19-22		L		L	L	Y	L	L	L	Y		L	L	ID/SW MT

1.3 Early GRSG Conservation

The BLM manages the majority of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State Distinct Population Segments). Efforts to conserve the habitat of this species did not begin with the 2011 BLM's National GRSG Planning Strategy, but rather, have been ongoing for many years.

The Western Association of Fish and Wildlife Agencies (WAFWA) 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, contributed to by the BLM, was to present an unbiased and scientific documentation of dominant issues and their effects on GRSG populations and sagebrush habitats.
http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the U.S. Fish and Wildlife Service (FWS), the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG.
http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation as well as summarizing BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States and Canada.
http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, BLM commissioned an effort to map breeding densities of GRSG across the West. A conference was convened with the state wildlife agencies to get approval and to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active leks across the West. This model served as a standard starting point for all states to identify priority habitat.

http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published their 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM and Forest Service as conservation measures in land use plans.

1.4 National Greater Sage Grouse Planning Strategy

Based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a listing decision on this species, the BLM recognized the need to incorporate explicit objectives and adequate conservation measures into RMPs by 2015 to conserve GRSG habitat and avoid the need to list the species under the Endangered Species Act. In August, 2011, the BLM chartered a planning strategy to evaluate the adequacy of BLM RMPs and address revisions and amendments throughout the range of the GRSG (with the exception of the bi-state population in California and Nevada, and the Washington state distinct population segment, which were addressed through other planning efforts). This Charter established the teams, team membership, and team operating procedures for the BLM's National GRSG Planning Strategy. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms through RMPs to conserve and restore the GRSG and its habitat on BLM-administered lands on a range-wide basis for the long-term (Figure C).
http://www.blm.gov/style/medialib/blm/wo/Communications_Directorate/public_affairs/sage-grouse_planning/documents.Par.2415.File.dat/Final%20Signed%20GSG%20Planning%20Strategy%20Charter.pdf

Two national teams and numerous other studies were used to help inform the planning efforts. The GRSG National Technical Team (NTT), comprised of BLM, FWS, USGS, NRCS, and State specialists, completed A Report on National Greater Sage-Grouse Conservation Measures in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats in the FWS listing action (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones (Figure 1-4). The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and

emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. ~~These WAFWA Management Zones are identified on **Figure 1-4** below.~~ http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

In 2012, FWS convened the Conservation Objectives Team (COT) of state and federal representatives to produce a peer-reviewed report which identified the principal threats to GRSG survival -- based upon the FWS 2010 listing decision -- and the degree to which these threats need to be reduced or ameliorated to conserve the GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The COT report also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". Finally, the COT report identified present and widespread, as well as localized threats by GRSG population across the West. These population specific threats, as specified from the COT report, are outlined in **Table 1-2**. **Figure 1-4** from the COT Report identifies the PACs, GRSG populations (and their names), and WAFWA Management Zones across the West. http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

[Insert **Figure 1-4** - GRSG Priority Areas for Conservation, Populations (and names), and WAFWA Management Zones.]

Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the ARMPAs.

To adequately address the reasons for the 2010 "warranted" determination by the FWS – and specific threats summarized in the COT report -- it was clear to the BLM that additional regulatory measures on federal public lands would be necessary to deal with present or threatened destruction, modification, or curtailment of habitat or range. These measures would need to be incorporated into land use plans that guide management actions on lands within the remaining range of the GRSG administered by the agencies to conserve GRSG such that listing under the ESA was no longer necessary.

In December 2011, the BLM published a Notice of Intent to prepare EISs and Supplemental EISs to incorporate GRSG Conservation Measures into Land Use Plans (LUPs) across the range of the species. A total of 15 sub-regional planning efforts (resulting in eight ARMPAs and nine ARMPs) would amend or revise 78 BLM RMPs ~~and 20 Forest LRMPs~~ across the range of the species.

The federal public land planning strategy reflected several key concepts:

- **Landscape-level**: The planning effort focused on the remaining habitat of the GRSG on public lands, covering 10 western states in the Great Basin and Rocky Mountain regions.
- **Best Available Science** – The ARMPAs/ARMPs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat and the NTT report, prepared by the BLM, provided options for dealing with the most significant threats to the GRSG. A series of reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the Western Association of Fish and Wildlife Agencies also provided crucial guidance in formulating the conservation strategy.
- **Targeted, Multi-Tiered Approach** – The ARMPAs/ARMPs were designed to incorporate a layered management approach to avoid or minimize additional surface disturbance in the most valuable habitat, known as Priority Habitat Management Areas (PHMA), which are largely consistent with PACs identified in the COT Report. Within PHMA, the ARMPAs/ARMPs

Comment [KK10]: In this section we go back to talking about the whole planning area, not just the ARMPAs for Great Basin. Is this necessary? If it is, is it clear to the average reader that we have made that transition & what the difference is between ARMPA and ARMP?

provide an added level of protection to limit or eliminate new surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. In General Habitat Management Areas (GHMA), the ARMPAs/ARMPs seek to minimize disturbance while providing greater flexibility for land use activities.

- **Coordinated**: The BLM ARMPAs/ARMPs were developed through a joint planning process led by the BLM with the Forest Service as partners. The USFWS provided guidance and input throughout the process to aid land managers in understanding the threats and the certainty and effectiveness of proposed land management actions in addressing those threats. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative**: The ARMPAs/ARMPs reflect the input of states and local stakeholders from the outset and were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Western Governors Association Sage Grouse Task Force (SGTF), which is discussed below, was particularly useful in facilitating this kind of collaborative input. The proposed LUPs reflect state and stakeholder developed approaches and economic priorities where consistent with conservation objectives.

Most states across the range provided recommendations for the management of the BLM lands in their state to conserve GRSG. In all cases, this input was incorporated into the range of alternatives analyzed in the Final EISs. Components of these state recommendations were used to develop the ARMPAs/ARMPs where consistent with conservation objectives.

In addition, the ~~Western Governors Association Sage Grouse Task Force~~SGTF was established in 2011 to identify and recommend state and federal conservation actions necessary to preclude the need for the GRSG to be listed under the ESA. This group, which includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, US Forest Service, US Geological Survey, and the Department of the Interior, played an integral role throughout this land use planning process.

1.5 Addressing Threats to the Greater Sage-Grouse through the ARMPA s

Comment [GSD11]: I talked to Jim yesterday about using the same three headers/categories we have used on other public and planning documents:

(1) Limiting or Eliminating Disturbance
(2) Improving Habitat Condition
(3) Fire

Comment [MEM12]: Reorganized – please see below.

The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to "maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations".[1] The NTT report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed"[2] And, in establishing the COT, with the backing of the SGTF, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006 WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following,

> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation

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[1] WAFWA 2006 Strategy. The 2006 objectives built on an initial framework and commitment made by the WAFWA directors, the BLM and the FWS in 2000 with the signing of an interagency sagebrush/sage-grouse conservation MOU.

[2] Sage-grouse National Technical Team. "A Report on National Greater Sage-Grouse Conservation Measures". December 21, 2011.

> success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."7

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

The ARMPAs/ARMPs were developed to remove or reduce identified threats to the species and are an essential component of the effort to conserve GRSG and avoid a listing of the species under ESA. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain updated land use plan direction on approximately 50 percent of the remaining habitat for the species. These ARMPAs/ARMPs are the product of extensive coordination between the BLM and the Forest Service and the active engagement of the USFWS in helping to inform land allocation and related management decisions by the BLM. The plans also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, and circumstances in each.

Comment [KK13]: Why is SGTF 11 if this is 10 – Washington state is included?

Designation of Habitat Management Areas

Comment [MEM14]: Let me know if you think I need to integrate this into this section better. I think it flows ok now.

In order to protect the most important GRSG habitat areas, the conservation strategy began with mapping areas of important habitat across the remaining range of the GRSG and within each state. In collaboration with state fish and wildlife agencies, the BLM identified areas as preliminary priority habitat ~~(PPH)~~ and preliminary general habitat ~~(PGH)~~. Maps were revised and refined as further mapping was conducted and state fish and wildlife agencies – often in collaboration with GRSG experts and researchers – provided more detailed analysis of habitat characteristics and populations. The ARMPAs reflect this input and have generally aligned these habitats with Habitat Management Areas in the ARMPAs. GRSG habitat management areas on BLM-administered lands in the decision area consist of lands allocated as Priority Habitat Management Areas (PHMA) which largely coincide with Priority Areas for Conservation in the COT report, General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table 1-4** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having the highest value for~~to~~ maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.
- **GHMA**— BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft RMP/EIS.
- **OHMA** —BLM-administered lands ~~only~~ in Nevada, identified as unmapped habitat in the Proposed RMP/EIS that are within the planning area and contain seasonal or connectivity habitat

areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.

- **IHMA** —BLM-administered lands in Idaho that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. ~~There are no IHMAs designated within southwestern Montana.~~ The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

Table 1-4
Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

The ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs (see **Figure 1-3** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). Across the Great Basin Region, there are 9,076,948 acres of BLM administered SFAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memorandum from the FWS Director to BLM Director and Forest Service Chief in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection" (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf)

This tiered habitat framework provides for a nested or layered conservation design with the greatest protections and limited new surface disturbance in SFAs, a high degree of certainty that the integrity of PHMAs can be maintained through management decisions to avoid or minimize additional surface disturbance, and protection of remaining habitats in GHMAs, with more flexibility for land use activities that would be designed to minimize impacts on existing GRSG leks. In all GRSG habitat management areas, anthropogenic surface disturbing activities would be mitigated, and degraded landscapes, due to fire or other causes, would be actively restored and protected with a priority on SFAs, then PHMAs, and then GHMAs. The combination of habitat classifications and land allocation decisions in the ARMPAs will provide the greatest protection for those areas identified as SFAs and meet the stated objective for these areas "where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species."

Comment [KK15]: ?? is this correct

Comment [KK16]: Just to confirm, IHMA & OHMA are never part of this hierarchy?

Major components of the attached ARMPAs ~~developed to~~that address the specific threats to the viability of the GRSG, as identified in the USFWS 2010 listing decision and COT Report (many of which were also identified by the BLM's NTT Report) are listed in **Table 1-3** and summarized below. Throughout the ARMPAs, a particular focus is placed on an "avoidance first strategy" as emphasized in the COT report by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is accomplished through identification and allocation of important GRSG habitat and excluding or avoiding surface disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which although more difficult and requiring a longer time frame, is important to the long-term viability of GRSG. Restoration decisions include specific habitat objectives, and a priority on treating GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* which provide a framework, specific actions, and Department-wide priority on managing Federal lands, particularly in the Great Basin, to protect and restore sagebrush-steppe habitat.

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development.	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) • PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)
Energy development—fluid minerals, including geothermal resources	• PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. In Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	authorization if certain criteria is met. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy development)
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals)
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	with the terms and conditions of grazing permits.
Free-roaming equid management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. • Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.
Recreation	• PHMA: Do not construct new recreation facilities unless required for health and safety purposes. • Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. • PHMA & GHMA: OHV use limited to existing routes (routes to be designated through future travel management planning)
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	• GRSG habitat will be retained in federal management.

Comment [KK17]: Matt, I am pointing out that I added this to the table – it was in redline in the last version from me & Jim, but since I moved the table I think the whole table was redline so I just want to be sure you see it.

The ARMPAs were developed based on three range-wide objectives for conserving and protecting habitat: minimizing new and additional surface disturbances, improving habitat conditions, and reducing threats of rangeland fire to GRSG and sagebrush habitat. How the ARMPAs met these objectives is summarized below.

1.5.1 Avoid and Minimize Surface Disturbance

Allocations and Habitat Protection/Surface Disturbance Measures

To avoid or minimize further surface disturbance in PHMAs the ARMPAs either close, exclude, or avoid major new surface disturbing activities. In SFAs, in addition to PHMA decisions described below and shown in **Table 1-3**, ARMPAs apply a no surface occupancy stipulation with no exceptions for oil and gas leasing and recommend these areas for withdrawal from future locatable mineral entry.

The four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA include, fo~~i~~r example, the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil and gas in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region.

Similarly, mineral development is closed in PHMAs for non-energy leasable minerals and saleable minerals, ~~with the exception of~~but not for locatable minerals governed under the 1872 Mining Act. An exception is granted for free use permits and the expansion of existing active pits for ~~mineral~~ saleable minerals ~~material sales~~ and expansion of existing non-energy leasable development. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

In all PHMAs in the Great Basin Region, renewable energy development (solar and wind) is excluded, with the exception of three areas in southeastern Oregon where an avoidance allocation is applied; and new rights of way and development for transmission lines, pipelines, and related infrastructure is avoided through restrictions on land use authorizations. Where the allocation is avoidance, exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat.

While restrictions on future development in PHMA are intended to avoid or minimize additional surface disturbance, restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation see **Table 1-3** for more details on GHMA management decisions. However, any disturbance is subject to mitigation and should seek to first avoid and then minimize any impacts to GRSG or its habitat, while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species. As noted in the COT report, "Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation activities

Comment [KK18]: Are these subheaders needed or can we just let this section flow from paragraph to paragraph?

Comment [KK19]: I changed this so we used the same name as the previous sentence & Table 3.

Comment [GSD20]: What is the relevance of this statement, do we not have the coal language in the other plans?

Comment [MEM21]: Because energy development is a present and widespread threat to certain populations in UT, I thin k its important to state this. We can remove if needed.

Comment [GSD22]: Do we need to explain why OR is different here or somewhere else?

Comment [KK23]: Is this three areas or three counties?

Comment [MEM24]: This should be addressed in section 1.6. May need assistance with this rationale.

outside of PACs are proposed, the project proponent should work with federal , state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

In addition to areas where uses are closed, excluded or avoided, the ARMPAs direct the BLM to proactively prioritize oil and gas leasing and development outside of identified SFAs, PHMAs, and GHMAs in order to encourage new development in areas that would not conflict with GRSG and thus maximize the potential to limit disturbance to remaining GRSG habitat. This approach will also assist developers in reducing the time and cost associated with oil and gas leasing development by avoiding sensitive areas and decreasing the need for compensatory mitigation.

In general, all forms of new development would be closed, excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat, assuring that existing habitat would be protected and providing opportunities through compensatory mitigation to restore degraded habitats. This is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*, published by the FWS in September 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse." In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation gain for the GRSG.

In addition to major surface disturbing activities such as energy and infrastructure development, the ARMPAs address other activities, including grazing, wild horse and burro management, and recreation. Grazing is the most widespread use of the sagebrush steppe ecosystem in the Great Basin Region. The COT Report recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the four Great Basin ARMPAs require the incorporation of GRSG seasonal habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritize the review and monitoring of grazing permits, and take numerous actions to avoid and minimize the impacts of range management structures (see **Table 1-3**).

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will focus on meeting and maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives, including completing rangeland health assessments, prioritizing gathers and population growth suppression techniques, and developing or amending Herd Management Area plans to incorporate GRSG habitat objectives and management considerations. In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.

Comment [KK25]: Don't think we can just say maintaining since most are currently over AML

Comment [JRL26]: Should we make note of commitment to bring all SFAs to AML by 2020?

Comment [MEM27]: The 2020 deadline is not mentioned as a management action in the ARMPAs. The language as presented is within all 4 ARMPAs.

To ameliorate the threat from recreational activities, new facilities or expansion of existing facilities (e.g., roads, trails, campgrounds) will not be authorized in PHMA unless the development results in a net conservation gain to GRSG its habitat. In PHMA and GHMA travel would be limited to vehicle routes. Initially, vehicles would be limited to existing routes until implementation travel management planning could be completed to designate routes. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning process.

Disturbance Caps, Density Caps, and Lek Buffers

In addition to the management actions and allocations discussed in detail in the sections above, the ARMPAs limit the amount of anthropogenic disturbances in PHMAs through the use of disturbance caps, density caps and lek buffers. These elements further address threats related to surface disturbances by limiting the amount of habitat impacted and keeping uses away from leks. In general, disturbance caps of 3% were established in accordance with the recommendations contained in the COT report. ~~i~~If the 3% anthropogenic disturbance is exceeded on lands (regardless of land ownership) within PHMA in any given Biologically Significant Unit (BSU), no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted within PHMAs in that Biologically Significant Unit. If the disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted until disturbance in the proposed project analysis area has been reduced to be under the cap (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.). The ARMPAs have a few modifications to the disturbance cap: Oregon does not allow more than 1% new anthropogenic disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, exceeding a 3% disturbance cap can occur at the BSU and/or the project level as long as the outcome results in a net conservation benefit as approved by the BLM in accordance with the process described in **Section 1.6**.

Comment [KK28]: Added a sentence to tie this section back to the threats it is addressing.

~~Limiting Density of Disturbance~~

The ARMPAs incorporate a cap on the density of energy and mining facilities to encourage consolidation of structures and to reduce habitat fragmentation. The cap is set at an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT report. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located into an existing disturbed area, subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc. The one facility per 640 density decision does not apply to Nevada, as described in **Section 1.6**.

~~Buffering Development Impacts~~

The ARMPAs require that impacts to leks be evaluated for actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from certain activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The lek buffer distances required vary by type of disturbance (road, energy development, infrastructure, etc.) and are fully described in Appendix X of the ARMPAs.

The lek buffer distances will be applied as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) as defined in the ARMPAs. In PHMA, if the action cannot be located outside of the buffer-distance, the BLM may approve actions in PHMAs that are within the applicable lek buffer-distance only if a different buffer distance offers the same or greater level of protection to GRSG and its habitat. In GHMAs actions may be approved within the applicable lek buffer distance only if a different distance offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations) and any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain.

Required Design Features

Required Design Features (RDFs) and Best Management Practices (BMPs) are required for certain activities in all GRSG habitat, including PHMA, GHMA, IHMA in Idaho and OHMA in Nevada. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). RDFs and BMPs have been developed for oil and gas development, infrastructure, range developments, and other surface disturbing activities and are fully described in Appendix X of the ARMPAs.

1.5.2 Improving Habitat Conditions

In addition to improving management of resource uses and avoiding further surface disturbance, the ARMPAs identify management actions to promote the restoration and improvement of GRSG habitat. The ARMPAs ~~also~~ describe a mitigation program, which follows the avoid, minimize, and compensate mitigation hierarchy. (See **Section 5** for more information.) Where compensatory mitigation is required to offset unavoidable impacts, habitat restoration activities will be developed in coordination with the states, to provide ~~for habitat restoration activities that produce~~ a net conservation gain for the GRSG.

~~In addition to improving management of resource uses and avoiding further surface disturbance, the ARMPAs identify management actions to promote the restoration and improvement of GRSG habitat~~, Decisions related to improving and restoring habitat particularly address~~ing~~ the threats of invasive species, pinyon and juniper expansion, as well as climate change. As with the management of uses, habitat management, restoration, and improvement action is prioritized first in SFAs, followed by PHMA, and then GHMA.

The ARMPAs ~~also~~ specify habitat objectives necessary for GRSG, used both to evaluate grazing and wild horse and burro management and for restoration purposes. These habitat objectives were developed for each of the GRSG's life history stages based on the ecology within each ARMPA's sub-region. These objectives will be used to meet the applicable land health standard in GRSG habitats. They also include maintaining a minimum of 70% of lands capable of producing sagebrush with 10-30% canopy cover, and address species richness and composition, as well as meeting land health standards considering the ecological potential for the site. These habitat objectives are a core component of the adaptive management and monitoring strategy (see section 6 for more information). The ARMPA adaptive management and monitoring strategy provides for specific monitoring of GRSG and its habitat. The data collected is used to evaluate the effects of authorized uses, restoration, and other activities to determine if unexpected impacts to GRSG are occurring that require changes to management to meet the objectives.

The ARMPAs also include specific decisions to improve habitat conditions and meet the habitat objectives related to treatment and removal of invasive annual grasses and the removal of

Comment [MEM29]: Should we add a reference to adaptive management and monitoring?

Comment [KK30]: This section did not quite flow, so I reworked it a bit

Comment [KK31]: Tying adaptive management and monitoring to this section . . .

encroaching pinyon juniper in SFA, PHMA, and GHMA, and restoration of degraded landscapes, including those impacted by fire events. ~~and post-fire restoration.~~

With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that inform that ARMPAs and supported the development of the *Integrated Rangeland Fire Management Strategy* are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.

1.5.3 Reducing Threats of Rangeland Fire to GRSG and Sagebrush Habitat

To ameliorate the threat from fire, the ARMPAs seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used unless necessary to facilitate site preparation for restoration of GRSG habitat. The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks. Through guidance in the proposed ARMPAs supplemented by the *Integrated Rangeland Fire Management Strategy*, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.

In addition to and complementing the ARMPAs described in this ROD, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department".** (emphasis added) The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes in areas identified by the Fire and Invasives Assessment Tool (FIAT) in priority habitat, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT process, applying recent science, identified highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rural Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

1.6 Unique Aspects of the Great Basin ARMPAs

Comment [MEM32]: Still need input from Sarah G here related to the rationale as to why these differences exists.

The ARMPAs and their associated environmental impact statements were developed through four ~~separate~~ planning efforts across the Great Basin Region (as described in **Section 1.1**). A landscape approach was used to create cohesive management across the range of GRSG, while also using the subregional plans to accommodate differences in resource conditions, degree of threats, and state management approaches. ~~BLM's land use planning process is a highly collaborative process, involving local cooperating agencies, stakeholders, and members of the public. As a result of conducting four separate planning efforts, each sub-region received unique comments and feedback from their differing cooperating agencies, stakeholders, and interested members of the public. These comments were used to develop the ARMPAs and as a result, the management direction presented in each of the attached ARMPAs addresses sub-regional conditions and management. In addition, a~~As a result of the varying subregional threats, ~~that were presented to local populations~~ (refer to Table 1-2), conditions, and management, each sub-region, in collaboration with their local cooperators and considering public comments, adapted the range-wide landscape approach to address these differences while ~~crafting different approaches to~~ meeting the overall purpose~~d~~ and need to conserve, enhance, and restore GRSG and their habitats. Below is a brief description of the unique aspects of each of the Great Basin sub-regional ARMPAs.

Idaho and Southwestern Montana

The Idaho and Southwestern Montana ARMPA adopted specific aspects of the State of Idaho's Conservation Plan for GRSG. The most important varying aspect adopted from the State's plan is a third tier of habitat management area, Important Habitat Management Areas (IHMA). IHMA are BLM-administered and National Forest System lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. This three-tiered approach also serves as the foundation for an adaptive management approach that includes habitat and population hard and soft triggers in areas most valuable to the GRSG and the shifting of IHMA to PHMA when triggers are hit. The Idaho ARMPA also includes a slightly different disturbance calculation, as described in Appendix X of the attached Idaho and Southwestern Montana ARMPA. The ARMPA ~~also~~ applies land use planning allocation decisions for certain distances from leks, which is a deviation from the other Great Basin ARMPAs.

Comment [KK33]: I think we should be more explicit about this & state clearly how it differs; this sentence is a bit opaque

Nevada and Northeastern California

The Nevada portion of the Nevada and Northeastern California ARMPA adopts key elements of the State of Nevada Greater Sage-Grouse Conservation Plan (State of Nevada 2014) and the State of Nevada Conservation Credit System (Nevada Natural Heritage Program and Sagebrush Ecosystem Technical Team 2014) by establishing conservation measures and focusing restoration efforts in the same key areas most valuable to the GRSG. Additionally, other unique aspects of the Nevada and Northeastern California ARMPA includes an NSO exception to geothermal leasing and development and a separate Disturbance Management Protocol (DMP) that is intended to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species will be achieved, with concurrence from the BLM, State of Nevada, and FWS. The Nevada and Northeastern California ARMPA also does not have density cap, which is present in the three other Great Basin Region ARMPAs.

Utah

The Utah ARMPA adopts the key elements of the GRSG conservation plans or directives developed by the State of Utah (Conservation Plan for Greater Sage-Grouse in Utah) and the State of Wyoming (Executive Orders 2011-05 and 2013-3), which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. Additionally, within GHMA, the Utah ARMPA allows for wind energy and high voltage transmission ROW development (consistent with the mitigation framework for the ARMPA), as well as oil and gas development, which is open with standard constraints. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

Oregon

The Oregon ARMPA adopts key elements of the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Hagen 2011) which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. Also, three areas in southeastern Oregon within PHMA are not designated as exclusion areas to solar and wind energy development, but are instead avoidance areas to these types of development.

Comment [KK34]: Counties?

1.7 Summary of the BLM's National GRSG Planning and Conservation Strategy

Pending

Comment [MEM35]: Deciphering whether or not this is needed. If needed, Jim will formulate based on the LR summary.

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments A, B, C, and D). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed. No further administrative remedies are available for these land use plan decisions.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in **Sections 1.1** of attachments A, B, C, and D. This ROD and ARMPAs become effective on the date this ROD is signed. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

The land use decisions provide conservation measures to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses
- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not for certain uses and are also used prioritize conservation and restoration management actions. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Management actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands..

The ARMPAs' management decisions were crafted to alleviate identified threats to GRSG and their habitats (see **Section 1.5**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not affect valid existing rights.

The ARMPAs do not contain decisions for the mineral estates of lands located in the planning area for lands under the jurisdiction of other Federal agencies such as the Forest Service, or for private or State-owned lands and minerals that are not administered by the BLM. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

- *Statutory requirements.* The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy.* The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM’s final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

During preparation of the ARMPAs for all four sub-regions, minor changes were made to the Proposed RMP Amendments to correct errors and to clarify decisions. Clarifications and corrections made since the Proposed RMP Amendments were published on May 29, 2015 are hereby adopted by this ROD.

2.4.1 Modifications and Clarifications by Sub-region

Modifications and clarifications are summarized below for each of the sub-regional ARMPAs.

Idaho and Southwestern Montana

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Nevada and Northeastern California

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Oregon

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Utah

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

2.4.2 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed RMPA/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four sub-regional PRMPAs/FEISs.

These decisions are final for the Department of the Interior. With the exception of the granted protest issues, the Director concluded that the BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party will be notified in writing of the Director’s findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.5.1.

Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director’s decisions on the protests are summarized in the “Director’s Protest Resolution Report, Idaho and Southwestern Montana GRSG Proposed RMP Amendment/Final EIS,” released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Nevada and Northeastern California

For the Nevada and Northeaster California GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Nevada and Northeastern California Sub-Regional GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Oregon

For the Oregon GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Oregon GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Utah

For the Utah GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Utah GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

2.4.3 Governors Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

In some instances, modifications to the Proposed RMP Amendments were addressed based on recommendations submitted to the BLM by the applicable states. These modifications to the ARMPAs are summarized below by sub-region and are now part of the attached ARMPAs.

Idaho and Southwestern Montana

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Nevada and Northeastern California

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Oregon

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Utah

Will need to populate the "X" areas towards the end of the GCR process (end of July).

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs influencing land management for the protection and enhancement of GRSG and its habitat. All management under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law there are typically few or no distinctions between alternatives.

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the USFWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix X, Required Design Features (RDFs), of each of the attached ARMPAs.

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, most management actions in GHMA reverted back to the No Action Alternative, which was found to not meet the purpose and need for the Amendments.

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below).

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required to conserve GRSG and its habitats. Alternative C was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which was identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocations are less stringent, but still aim to protect GRSG habitat (for example, applying moderate constraints and stipulations to fluid minerals in GHMA).

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative provided by the State or Governor's offices for inclusion and analysis in the EISs. It incorporates guidance from specific state conservation strategies, if developed or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. This document describes the Oregon Department of Fish and Wildlife's proposed management of GRSG on Federal lands. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, the planning area includes all occupied GRSG habitat in Utah. Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. Alternative E1 was designed to eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected, in whole, as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the ARMPA were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. Alternative F was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM has developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focus on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative Considered in all Sub-Regions

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

<u>Idaho and Southwestern Montana</u>

- USFWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

<u>Nevada and Northeastern California</u>

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

<u>Oregon</u>

- USFWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

<u>Utah</u>

- USFWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)

- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. MANAGEMENT CONSIDERATIONS

The BLM is tasked to provide multiple use management for public lands by the Federal Land Policy and Management Act (FLPMA) and numerous other laws and regulations that govern the management of public lands. Due to the diversity of community needs and stakeholders affected by management of BLM lands, there has been both support and opposition to certain components of the Proposed Plans. BLM's objective in choosing the Proposed Plan Amendments as the ARMPAs was to address diverse needs and concerns in a fair manner and provide a practical and workable framework for management of public lands in GRSG habitat. The BLM is ultimately responsible for preparing these ARMPAs consistent with its legal mandates that reflect collective professional judgment using the best available science. The ARMPAs provide a balance between those reasonable measures necessary to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat to meet the purpose and need of these plan amendments, and the ongoing public need for use of the public lands within the Great Basin Region planning area.

The ARMPAs were selected because they will reduce or eliminate threats to GRSG at a landscape scale, improve and sustain properly functioning resource conditions, and consider needs and demands for existing or potential resource commodities and values. In the end, GRSG habitat will be managed by integrating ecological, economic, and social principles in a manner that safeguards the long term sustainability, diversity and productivity of the land.

In 2012, the FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as articulated in the COT report – is summarized in **Table 1-2**. **Table 1-3** provides a crosswalk between the threats to GRSG and their habitat identified in the COT Report and the key management responses from the ARMPAs that aim to ameliorate these threats.

5. MITIGATION MEASURES

In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the GRSG including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include ~~those identified as~~ threats which contribute to GRSG disturbance as identified by the FWS in its 2010 listing decision (75 FR 13910), COT report, and depicted in the ARMPAs' Monitoring Framework (which can be found in Appendix X of each of the attached ARMPAs). Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g. avoid, minimize, and compensate). If impacts from BLM management actions and authorized third-party actions (which are consistent with the goals, objectives, and management actions in the attached ARMPAs) that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation would be durable, timely, and in addition to what would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in the Mitigation Strategy, which can be found in Appendix X of each of the attached ARMPAs).

All practical means to avoid or minimize environmental harm, specifically to GRSG and its habitat are encompassed in the attached ARMPAs and associated appendices. Mitigation measures, including the application of required design features have been identified.

The ARMPAs also identify the development of regional mitigation strategies, in partnership with the states, to guide and target mitigation to achieve the greatest benefit to GRSG and habitat conservation and restoration. Within 90 days of the issuance of the Record of Decision~~s~~, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for actions and third party authorizations that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat. The mitigation strategy will be developed within one year of the issuance of the Record of Decision~~s~~.

6. PLAN MONITORING AND ADAPTIVE MANAGEMENT

Comment [MEM36]: Moved content from the original Section 1.5.3 to here. The CEQ regs do not state that "monitoring" needs to be a standalone, so I think we are ok here.

Plan Monitoring

Monitoring tied to the ARMPAs has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can assess how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of ARMPAs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for ARMPA effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.

The BLM Assessment, Inventory, and Monitoring (AIM) Strategy (Toevs et al. 2011 and IB2012-080) describes a vision for integrated, cross-program assessment, inventory, and monitoring of resources at multiple scales of management. Following the AIM Strategy, the BLM is modernizing its resource monitoring approach to more efficiently and effectively meet local, regional, and national resource information needs. The AIM Strategy provides a process for the BLM to collect quantitative information on the condition, trend, amount, location, and spatial pattern of natural resources on the public lands. Each AIM-Monitoring survey, at any scale of inquiry (from the plot level to west-wide deployments), uses a set of core indicators, standardized field methods, remote sensing, and a statistically-valid study design to provide nationally-consistent and scientifically-defensible information to determine conditions (e.g., rangeland health) and trends on public lands.

Comment [KK37]: I think this can all be deleted and the first sentence can just flow into the next paragraph

The National-scale deployment of AIM, known as the Landscape Monitoring Framework (LMF), commenced in 2011 in coordination with NRCS, with the collection of 1,000 plots of field-collected monitoring data across the Western U.S. LMF aims to provide non-biased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. A group of GRSG habitat and sagebrush plant community subject matter experts from BLM, USFWS, WAFWA, NRCS, ARS, state wildlife agencies, and academia identified those vegetation indicators collected at LMF sampling points that inform GRSG habitat needs. The common indicators that were identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, inter-canopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of GRSG, additional plot locations in occupied GRSG habitat (Sage-grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS Rangeland Monitoring Survey. The GRSG baseline data will be collected over a five year period and an annual report will be prepared describing the status of the indicators. Beginning in year six, the annual status report will be accompanied with a trend report which will be available on an annual basis thereafter contingent upon continuation of the current monitoring budget. This information, in combination with mapping information, mid-scale habitat suitability indicator measures, and sagebrush availability information will be used to assess the effectiveness of the planning strategy.

The BLM has made significant commitments in the ARMPAs to monitoring actions to conserve GRSG habitats at multiple scales. The results from the monitoring will inform the agencies of the effectiveness of efforts to reduce disturbance and restore seasonal habitats in priority areas, and of the status of the triggers set in the proposed LUPs for adaptive management. The BLM will report annually on the results of the monitoring efforts.

The BLM's Monitoring Framework can be found in Appendix X of each of the attached ARMPAs.

Adaptive Management

The ARMPAs include an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored - habitat loss and/or population declines. Adaptive Management with specific triggers provide additional certainty that the regulatory mechanisms included in the ARMPAs are robust and able to respond to a variety of conditions and circumstances quickly and effectively to conserve GRSG habitat.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the ~~proposed LUPs~~ARMPAs, the BLM's response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each ARMPA, a soft trigger begins a dialogue between the state, FWS, and the BLM to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines).

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the attached ARMPAs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs, the BLM will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the ARMPAs. ARMPA specific strategies can be found in Appendix X of each of the attached ARMPAs.

7. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

The BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department of the Interior policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date.

7.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Proposed RMP Amendments/FEIS, Idaho and Southwestern Montana conducted seven public meetings, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plans. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft EISs' comment periods. Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMP Amendments.

A Notice of Availability (NOA) for the Great Basin Region GRSG Proposed RMP Amendments and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governors' consistency review. Refer to **Section 2.5** for a full description of the protest period and governors' consistency review outcomes.

7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the USFWS and the U.S. Forest Service. In addition, the Great Basin sub-regions' also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 13 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. For a full list of these cooperating agencies divided by sub-region, refer to the Cooperating Agencies List at the beginning of this ROD. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs.

7.2 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the USFWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the USFWS for review. The USFWS evaluated the biological assessments and concurred with the "no affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the threatened listed Utah Prairie Dog. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix X of Attachment X).

[Verify that the above paragraph is applicable to UT once BLM UT hears back from their local FWS.]

7.3 Native American Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

The Draft RMP Amendments/EISs were provided to the Idaho, Montana, Nevada, California, Oregon, and Utah State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMP Amendments/FEISs were also provided to the SHPOs.

[Verify that the above paragraph is applicable to UT.]

7. REFERENCES

Comment [MEM38]: Need to ask EMPSi if they can formulate.

8. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision.

The Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published on May 29, 2015, in the Federal Register (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

I hereby approve the land use plan amendments decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Sally Jewell Secretary Department of the Interior	Date

9. ATTACHMENTS

Appendix A. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix B. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Appendix C. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region including the Greater Sage-Grouse Sub-Regions of:

Idaho and Southwestern Montana
Nevada and Northeastern California
Oregon
Utah

Prepared by:

U.S. Department of the Interior
Bureau of Land Management
Washington, DC

September 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

[Insert BLM WO Letterhead]

In Reply Refer To:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). The ROD approves the four Great Basin Region ARMPAs, which are part the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011. The conservation strategy was initiated by the Bureau of Land Management (BLM) in response to the U.S. Fish and Wildlife Service's (FWS) March 2010 "warranted, but precluded" Endangered Species Act (ESA) listing petition decision. In this decision, the FWS identified the inadequacy of regulatory mechanisms as a significant threat to GRSG. RMP conservation measures were identified as the BLM's principal regulatory mechanism.

The BLM's ARMPAs provide a landscape-level, science-based, coordinated, collaborative strategy for addressing threats to the Greater Sage-Grouse (GRSG) and its habitat. This strategy was designed to address issues identified in the FWS 2010 "warranted but precluded" decision. In addition, the strategy was guided by over a decade of research, analyses and recommendations for GRSG conservation including the Conservation Objectives Team (COT) Report and the BLM National Technical Team (NTT) Report. Each of these reports was developed through a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and other partners were fundamental to the development of these ARMPAs.

It is important to note that this ROD and these ARMPAs apply only to BLM-administered lands, including BLM sub-surface mineral estate. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. These Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs for the Great Basin sub-regions included proposed GRSG management direction for National Forest System lands (in Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah). However, the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy and Management Act (FLPMA) require the development and maintenance, and, as appropriate, the revision of land use plans for management of public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions significantly affecting the quality of the human environment. In fulfillment of these requirements, the Draft RMP Amendments/Draft EISs incorporated analysis and input provided by the public; local, State, and other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM resource specialists, and were published in the fall of 2013. Ninety -day public comment periods ensued, with more than 4,990 substantive comments from 1,348 unique letters submitted on all four sub-regional proposed LUPAs/Final EISs in the Great Basin Region. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

The Proposed RMPAs/Final EISs were made available on May 29, 2015, for a 60-day governor's consistency review and 30-day protest period. The BLM received consistency review letters from the States of California, Idaho, Montana, Nevada, Oregon, and Utah in the Great Basin Region and has worked closely with these states to address their concerns and to resolve inconsistencies where possible. Across all four sub-regions in the Great Basin Region, 133 protest submission letters were received from government entities, private citizens, NGOs, and other stakeholders; 124 of these submissions contained valid protest issues pursuant to 43 CFR 1610.5-2 and were addressed in the Director's Protest Resolution Reports. These reports are available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

The BLM now approves the attached ARMPAs as the land use plans that will guide future land and resource management within GRSG habitat in the Great Basin Region for the life of the plan amendments. The ARMPAs will benefit GRSG and over 350 other species of wildlife as well as other multiple uses, including grazing and recreation, which depend on healthy sagebrush-steppe landscapes.

Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the public, local, state, and other federal agencies, Native American tribal representatives, and the Cooperating Agencies, all of whom contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This Record of Decision (ROD) is the culmination of an unprecedented effort to conserve Greater Sage-Grouse habitat on public lands administered by the Bureau of Land Management (BLM), consistent with the BLM's multiple use and sustained-yield mission and the joint objective established by federal and state leadership through the Greater Sage Grouse Task Force to conserve GRSG habitat on federal, state, and private land such that additional protections under the Endangered Species Act (ESA) can be avoided.

In response to a 2010 determination by the FWS that the listing of the GRSG under the ESA was "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service), has developed a targeted, multi-tiered, coordinated, collaborative landscape-level management strategy, based on the best available science, that offers the highest level of protection for GRSG in the most important habitat areas to address the specific threats identified in the 2010 FWS "warranted but precluded" decision and the FWS 2013 Conservation Objectives Team (COT) report.

This ROD and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah include management direction avoids and minimizes additional disturbance in GRSG habitat management areas as well as targets restoration and improvements to the most important areas of habitat. The management direction in the ARMPAs is accomplished through land use allocations that generally apply to GRSG habitat. These allocations (1) eliminate most new surface disturbance in the most highly-valued sagebrush ecosystem areas identified as Sagebrush Focal Areas (SFAs); (2) avoid or limit new surface disturbance in Priority Habitat Management Areas (PHMAs), of which SFAs are a subset; and (3) minimize surface disturbance in General Habitat Management Areas (GHMA). In addition to protective land use allocations in habitat management areas, the ARMPAs include a suite of management actions, such as the establishment of disturbance limits, GRSG habitat objectives, mitigation requirements, monitoring protocols, and adaptive management triggers and responses, and other conservation measures that apply throughout designated habitat management areas. The cumulative effect of these measures is to conserve, enhance, and restore GRSG habitat across the remaining range of the species in the Great Basin and provide greater certainty that BLM land use plan decisions in GRSG habitat in the Great Basin Region can lead to conservation of the GRSG and other sagebrush-steppe associated species in the region.

The targeted land use plan protections presented in this ROD and ARMPAs not only protect the GRSG and its habitat, but also over 350 wildlife species associated with the sagebrush-steppe ecosystem, which is widely recognized as one of the most endangered ecosystems in North America. Reversing the slow degradation of this valuable ecosystem will also benefit local rural economies and a variety of rangeland uses in addition to habitat protection, including recreation and grazing, in a manner that safeguards the long term sustainability, diversity and productivity of these important and iconic landscapes.

This conservation strategy has been developed in conjunction with the 10 states in which the ARMPAs in the Great Basin and the plans in the Rocky Mountain Region apply. In combination with additional state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna in order to achieve the COT Report objective of "conserv[ing] the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT Report. 2013].

Table of Contents

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

This Record of Decision (ROD) approves the BLM's attached approved resource management plan amendments (ARMPAs) for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern

Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPAs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM-administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.), BLM planning regulations (43 Code of Federal Regulations [CFR] §1601 et seq.), and other applicable laws. The BLM prepared Environmental Impact Statements (EISs) in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA) and the Council on Environmental Quality's Regulations for implementing the procedural provisions of NEPA (40 CFR §1500.1 et seq.).

Throughout the GRSG planning process, the Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities for the Great Basin Region, which is available at http://www.fs.usda.gov/r4/.

This ROD, in conjunction with the ARMPs and ARMPAs approved through the Rocky Mountain ROD, constitute land use planning decisions of the BLM to conserve the GRSG and its habitats throughout that portion of the remaining range of the species that is administered by the BLM under authority of FLPMA. The efforts of the BLM, in coordination with the U.S. Forest Service on National Forest System lands within the remaining range of the species, constitutes a coordinated strategy for conserving the GRSG and the sagebrush-steppe ecosystem on the majority of Federal lands on which the species depends. These decisions complement those implemented by federal agencies through the Rangeland Fire Strategy and the Sage Grouse Initiative as well as those implemented by state and local governments as well as private land owners and other partners.

1.1 Great Basin Region Planning Area

The Great Basin Region planning area is composed of four sub-regions: the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. (see **Figure 1-1** – Great Basin Region Greater Sage-Grouse Sub-regions). A separate EIS was prepared for each of these sub-regions. Each sub-region conducted its own planning effort with input from local cooperators, stakeholders, and members of the public. The sub-regional boundaries were constructed to align with BLM administrative offices, state boundaries, as well as areas that shared common threats to the GRSG and their habitat. The boundaries for these sub-regions largely coincide with zones III, IV, and V identified by the Western Association of Fish and Wildlife Agencies (WAFWA) Greater Sage-Grouse Conservation Strategy to delineate management zones with similar ecological and biological issues.

[Insert **Figure 1-1** - Great Basin Region Greater Sage-Grouse Sub-regions]

The Great Basin Region planning area boundaries include all lands regardless of jurisdiction (see **Figure 1-2** - Great Basin Region Planning Area). **Table 1-1** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and privately owned lands within the four sub-regions that make up the Great Basin. The planning area also includes other BLM-administered lands that are not identified as habitat management areas for GRSG. The ARMPAs generally do not establish any additional management for these lands outside of GRSG habitat management areas and they will continue to be managed according to the existing land use plans for these planning areas.

[Insert **Figure 1-2** - Great Basin Region Planning Area]

Table 1-1
Land Management in the Great Basin Planning Area

Surface Land Management	NV/NE CA	ID/SW MT	Utah	Oregon	Great Basin Total
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,597,500**
USFWS	805,900	81,400	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,300**	**48,209,900**	**31,656,200**	**194,208,900**

Source: BLM GIS 2015
Acres have been rounded to the nearest hundredth.

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure 1-3** - Great Basin Region Decision Area , Greater Sage-Grouse Habitat Management Areas (BLM-administered)), including surface and split-estate lands where the BLM has subsurface mineral rights. For a description of these habitat management areas, refer to **Section 1-5**.

[Insert **Figure 1-3** - Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas (BLM-administered)]

1.2 Early GRSG Conservation Efforts

Currently, GRSG occupy an estimated 66% of the historically occupied range. The BLM manages the majority of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State populations). Efforts to conserve GRSG habitat by the BLM and other wildlife conservation agencies and organizations have been ongoing for many years. These efforts provide an important foundation for the GRSG conservation strategy that guides these plans.

The WAFWA 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, which includes contributions from the BLM, was to present an unbiased and scientific assessment of dominant issues and their effects on GRSG populations and sagebrush habitats.

http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the FWS, the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG. http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation and summarize the BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States.

http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, the BLM commissioned an effort to map and model breeding densities of GRSG across the West. A conference was convened with state wildlife agencies to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active leks across the West. This model served as a standard starting point for all states to identify priority habitat for the species.

http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published its 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910 (March 23, 2010)). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" under the Endangered Species Act (ESA). This finding indicates that, although the species meets the criteria for listing, immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

As part of their 2010 finding, the USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910 (March 23, 2010)). In addition, the FWS found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM, which manages approximately 66 million acres of the remaining habitat for the species (See **Figure 1-4**.), the USFWS has identified the agency's Resource Management Plans (RMPs) as the primary regulatory mechanisms.

1.3 Threats to Greater Sage-Grouse in the Great Basin Region

The FWS identified a number of specific threats to GRSG in the Great Basin Region in the context of its 2010 finding. The primary threats identified are the widespread present and potential impacts of wildfire, the loss of native habitat to invasive species, and conifer encroachment. Other threats, some of which are more localized by nature, include habitat fragmentation due to anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization and sagebrush elimination, as well as impacts to habitat associated with free-roaming equids and improper livestock grazing.

In 2011, the BLM established the GRSG National Technical Team (NTT), comprised of BLM, USGS, NRCS, and State Agency specialists. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable GRSG populations focused on the threats identified in the FWS listing determination (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones (Figure 1-4). The NTT produced *A Report on National Greater Sage-grouse Conservation Measures* (The NTT Report) which proposed conservation measures based on habitat requirements and other life history requirements for GRSG. The NTT Report described the scientific basis for the conservation measures proposed within each program area. The NTT Report also emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. To view the NTT Report, go to:

http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

In 2012, the USFWS, with the support of the Western Governors Association Sage Grouse Task Force, convened the Conservation Objectives Team (COT), comprising state and federal representatives, to produce a peer-reviewed report identifying the principal threats to GRSG survival and the degree to which these threats need to be reduced or ameliorated to conserve the GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The COT Report, released in March 2013, also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". Finally, the COT report identified present and widespread, as well as localized threats by GRSG population across the West (**Table 1-2)**. The BLM also identified and explained additional threats in the Final EISs that were published with proposed plans on May 29, 2015. **Figure 1-4** identifies the PACs, GRSG populations (and their names), and WAFWA Management Zones across the West. To view the COT Report, go to: http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

[Insert **Figure 1-4** - GRSG Priority Areas for Conservation, Populations, and WAFWA Management Zones.]

A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as highlighted in the 2013 COT report – is provided in **Table 1-2**.

Population	**Unit Number**	**Isolated Small Siz**	**Sagebrush Eliminat**	**Agriculture Conver**	**Fire**	**Conifers**	**Weeds/Annual Grass**	**Energy**	**Mining**	**Infrastructure**	**Improper Grazing**	**Free-Roaming Equid**	**Recreation**	**Urbanization**	**EIS/Plan**

		e	ion	sion			es					s			
Rich-Morgan-Summit (UT)	9b				Y	Y	Y	Y		Y			Y	Y	UT
Uintah (UT)	9c				Y	Y	Y	L	Y	Y			Y	Y	UT
Strawberry Valley (UT)	10a	Y			Y	Y	Y	Y		Y			Y		UT
Carbon (UT)	10b	Y			Y		Y	Y	Y	Y			Y		UT
Sheeprock Mountains (UT)	11	Y			Y	L	L	Y	Y	L		Y	L		UT
Emery (UT)	12	Y			Y	Y	Y	Y	Y	Y			Y		UT
Greater Parker Mountain (UT)	13a				Y	Y	Y			Y			Y		UT
Panguitch (UT)	13b			Y	Y	Y	Y	Y	L	Y			Y	L	UT
Bald Hills (UT)	13c	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	UT
Ibapah (UT)	15a	Y			Y	Y	Y	Y	Y	Y		Y	Y		UT
Hamlin Valley (UT)	15b	Y			Y	Y	Y			Y		Y	Y		UT
Box Elder (UT)	26b			Y	Y	Y	Y	L	Y	Y			Y		UT

Table 1-2. Threats to GRSG in the Great Basin Region (Utah) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	Unit Number	Isolated Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifers	Weeds/Annual Grasses	Energy	Mining	Infrastructure	Improper Grazing	Free-Roaming Equids	Recreation	Urbanization	EIS/Plan(s)
N. Great Basin (OR, ID, NV)	26a		L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	ID/SW MT, OR, NV/CA
Baker (OR)	17	Y	Y	Y	Y	L	Y	L	Y	L	U		L	L	OR
Central Oregon (OR)	28		L	L	Y	Y	Y	L	Y	L	Y	U	L	L	OR
W. Great Basin (OR, CA, NV)	31		L	L	Y	Y	Y	L	L	L	Y	Y	U		OR, NV/CA
Klamath (CA)	29	Y	U	U	Y	Y	Y	L		U	U	U	U	U	NV/CA
Northwest Interior (NV)	14	Y			Y		Y	U	Y	Y	Y	Y	Y		NV/CA
Southern Great Basin (NV)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y		NV/CA
Quinn Canyon Range (NV)	16	Y			Y	Y	Y			Y	Y	Y	Y		NV/CA
Warm Springs Valley (NV)	30	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	NV/CA
East Central (ID)	18	Y	L	Y	L	Y	L	Y		Y	Y		L		ID/SW MT

Snake-Salmon-Beaverhead (ID)	23		L	L	**Y**	L	**Y**	**Y**		L	**Y**	**Y**	L		ID/SW MT
Weiser (ID)	25	**Y**	L	L	L	L	**Y**	**Y**		L	**Y**		L	L	ID/SW MT
Sawtooth (ID)	27	**Y**	L		L	U	L			**Y**	**Y**		L		ID/SW MT
Southwest Montana (MT)	19-22		L		L	L	**Y**	L	L	L	**Y**		L	L	ID/SW MT

Table 1-2. (cont.) Threats to GRSG in the Great Basin Region (OR, CA, NV, ID, SWMT) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

1.4 National Greater Sage Grouse Conservation Strategy

Based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a listing decision on this species, the BLM recognized the need to incorporate explicit objectives and concrete conservation measures into Resource Management Plans (RMPs) to conserve GRSG habitat and provide robust regulatory mechanisms. In August, 2011, the BLM chartered a strategy to revise and amend existing RMPs throughout the range of the GRSG to incorporate management actions intended to conserve, enhance, and restore the species and the habitat on which it depends. Separate planning efforts were initiated to address the conservation needs of the Bi-State population in California and Nevada, and the Washington State distinct population segment.

In light of the 2010 “warranted” determination by the FWS, and specific threats summarized in the COT Report, the BLM found that additional management direction and specific conservation measures on federal public lands would be necessary to address the present and anticipated threats to GRSG habitat and to restore habitat where possible. The BLM proposed to incorporate the management direction and conservation measures into the BLM’s land use plans. The goal of incorporating these specific measures into BLM land use plans is to conserve, enhance, and restore GRSG and its habitat and to provide sufficient regulatory certainty such that the need for listing the species under the ESA may be avoided.

In December 2011, the BLM published a Notice of Intent to prepare EISs and Supplemental EIS to incorporate GRSG Conservation Measures into Land Use Plans (LUPs) across the range of the species. A total of 15 sub-regional planning efforts and associated EISs were intiated to analyze the alternatives developed for each of the plan amendments and revisions across the range of the species. [1] **Figure 1-5**

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[1] The National GRSG Conservation Strategy consisted of 15 separate EISs. The Bighorn Basin RMP has been split between the two field offices that make up the Bighorn Basin planning area, the Cody Field Office ARMP and the Worland Field Office ARMP. The Billings and Pompeys Pillar National Monument RMP has also been split between the Billings Field Office ARMP and Pompeys Pillar National Monument ARMP. This results in a total of 17 ARMPs and ARMPAs.

illustrates the regional and sub-regional planning area boundaries, along with BLM-administered PHMAs and GHMAs across the Western United States.

[Insert **Figure 1-5** – Regional and Sub-Regional Boundaries with GRSG Habitat Management Areas (BLM-Administered Lands)]

The planning efforts associated with the National GRSG Conservation Strategy have been coordinated under two administrative planning regions: the Rocky Mountain Region and the Great Basin Region. The regions were drawn roughly to correspond with the threats identified by USFWS in the 2010 listing decision, along with the WAFWA Management Zones (MZs) framework (Stiver et al. 2006). Due to differences in the ecological characteristics of sagebrush across the range of the greater sage-grouse, WAFWA delineated seven Management Zones (MZs I-VII) based primarily on floristic provinces. Vegetation found within a MZ is similar and sage-grouse and their habitats within these areas are likely to respond similarly to environmental factors and management actions.

The Rocky Mountain Region is comprised of BLM planning efforts (which includes plan revisions and plan amendments) in the states of Montana, North Dakota, South Dakota, Wyoming, Colorado, and portions of Utah. This region falls within WAFWA MZs I (Great Plains), II (Wyoming Basin) and a portion of VII (Colorado Plateau). The Great Basin Region is comprised of planning efforts (plan amendments) in California, Nevada, Oregon, Idaho, and portions of Utah and Montana. This region falls within WAFWA MZs III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin).

Both the Rocky Mountain and Great Basin regions are further divided into sub-regions. The NEPA EIS analyses were done at the sub-regional level. These sub-regions are based on the identified threats to the GRSG and the WAFWA MZs from the FWS 2010 listing decision with additional detail regarding threats to individual populations and sub-regions from the FWS COT report. In the Rocky Mountain Region, some sub-regions correspond to BLM field/district office boundaries, specifically for planning efforts that are incorporating GRSG conservation measures through plan revisions that were initiated prior to the start of the National GRSG Conservation Strategy in December 2011.

The BLM used the best available science, including additional review from the USGS on specific issues that arose in developing the ARMPAs. Additionally, the BLM considered state GRSG conservation strategies where they existed, as well as state recommendations for measures to conserve GRSG on BLM-administered lands, where relevant, in the planning effort. These are reflected in the approved plans to the extent compatible with GRSG conservation objectives to conserve, enhance and restore GRSG habitat to address the threats identified in the FWS 2010 listing determination and the 2013 COT Report.

1.5 How the Approved Resource Management Plan Amendments Address the Identified Threats to the Conservation of the GRSG

The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to “maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations". The NTT Report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed".

In establishing the COT, with the backing of the Sage Grouse Task Force, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006 WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following:

> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels. (WAFWA 2006 Strategy)"

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized an "avoidance first strategy" and stressed those threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

The plans were developed to address specific, identified threats to the species in order to conserve GRSG such that the need to list the species under ESA may be avoided. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain land use plan direction on approximately 66 million acres of the remaining habitat for the species (See **Figure 1-5**.). These plans are the product of extensive coordination between the BLM and the Forest Service and the active engagement of the FWS which informed the BLM and Forest Service land allocation and related management decisions. The plans also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, priorities and approaches in each.

In order to protect the most important GRSG habitat areas, the planning effort began with mapping areas of important habitat across the range of the GRSG. In collaboration with state fish and wildlife agencies, the BLM identified areas as preliminary priority habitat (PPH) and preliminary general habitat (PGH). In Utah, all occupied GRSG habitat was identified as PPH. The draft land use plans used PPH and PGH to analyze the impacts of the decisions the BLM was proposing in the plans. PPH and PGH were identified as Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) in the Proposed RMP Amendments/Final EISs to identify the management decisions which apply to those areas (except for Nevada and Utah). The designated GRSG Habitat Management Areas on BLM-administered lands in the decision area include: PHMA, which largely coincide with Priority Areas for Conservation (PACs) identified in the COT Report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report) (See **Figure 1-4**); GHMA; Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California); and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table 1-4** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

Habitat maps were based initially on state key habitat maps which identified areas necessary for sage-grouse conservation derived from various data sources including breeding bird density maps and lek counts, nesting areas, sightings, and habitat distribution data including occupied suitable seasonal habitats, nesting and brood rearing areas, and connectivity areas or corridors. This information served as the basis for the development of BLM preliminary priority habitat (PPH) and preliminary general habitat (PGH) maps and, subsequently, for the identification of Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas, respectively. The COT also used state key habitat maps as a basis for identifying Priority Areas for Conservation (PACs). The COT report notes that there is substantial overlap between PACs and BLM PPH areas, with the exception of areas in Nevada and Utah [COT Report, p 13].

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having highest habitat value for maintaining sustainable GRSG populations. The boundaries and management strategies for PHMAs are derived from and generally follow the Preliminary Priority Habitat boundaries. Areas of PHMAs largely coincide with areas identified as Priority Areas for Conservation (PACs) in the COT report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report).
- **GHMA**— BLM-administered lands that are occupied seasonal or year-round habitat outside of PHMA where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMAs are derived from and generally follow the Preliminary General Habitat boundaries.
- **OHMA** —BLM-administered lands in Nevada, identified as unmapped habitat in the Proposed RMP/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.
- **IHMA** —BLM-administered lands in Idaho that provide a management buffer for PHMAs and connect patches of PHMAs. IHMAs encompasses areas of generally moderate to high habitat value habitat and/or populations, but that are not as important as PHMAs. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

Table 1-3

Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah*	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0

Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

*41,200 acres of National Forest System lands in the Anthro Mountain area of Utah would be managed as neither PHMA nor GHMA. These areas would be identified as "Occupied – Anthro Mountain." In the Utah ARMPA, these areas are considered split-estate, where the BLM administers the mineral estate.

The ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs (see **Figure 1-3** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). Across the Great Basin Region, there are 8,385,280 acres of BLM administered SFAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" and which represent "a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection". (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf).

SFAs are areas of highest habitat value for GRSG and are managed to avoid new surface disturbance, to the extent permitted by law, given that they contain high-quality sagebrush habitat; highest breeding densities; have been identified as essential to conservation and persistence of the species; represent a preponderance of current federal ownership and, in some cases, are adjacent to protected areas that serve to anchor the conservation importance of the landscape. SFA management is consistent with the recommendations provided by FWS that these are the areas "where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species."

This tiered habitat management area framework, in associated with the land use plan allocation decisions (explained more fully in Section 1.6.2 of this ROD) in the ARMPs and ARMPAs provide a high degree of certainty that the integrity of PHMAs can be maintained through management decisions to avoid or minimize additional surface disturbance.

Remaining habitats in GHMAs and IHMAs (applicable only to BLM-administered lands in Idaho) would be managed consistent with the COT Report recommendation to recognize "that important habitats outside of PACs be conserved to the extent possible". Thus, land allocations in GHMAs and IHMAs provide for more flexibility for land use activities while minimizing impacts on existing GRSG leks.

Major components of the attached ARMPAs that address the specific threats to GRSG and its habitat, as identified in the USFWS 2010 listing decision and 2013 COT Report (many of which were also identified by the BLM's 2011 NTT Report) are listed and summarized in **Table 1-4**.

Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat	Key Management Responses from the Great Basin Region GRSG ARMPAs

(from COT Report)	
All threats	● Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. ● Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner.
All development threats, including mining, infrastructure, and energy development.	● PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) ● PHMA and IHMA: Apply a disturbance density cap of 1 energy and mining facility per 640 acres (except in the State of Nevada) ● IHMA: Implement the 3% disturbance cap. Apply Anthropogenic Disturbance Development Criteria. ● Apply buffers based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. ● Apply Required Design Features (RDFs) when authorizing actions in GRSG habitat. ● Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. ● Consider the potential for the development of valid existing rights when authorizing new projects in PHMA. ● When authorizing third-party actions that result in habitat loss and degradation, require and ensure mitigation that provides a net conservation gain to the species.
Energy development—fluid minerals, including geothermal resources	● PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. In Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for authorization if certain criteria are met. ● IHMA: Open to fluid mineral leasing subject to NSO stipulation without waiver or modification, and with limited exception. ● GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations) ● Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.

Energy development—wind energy	● PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) ● IHMA: Avoidance area (may be available for wind energy development with special stipulations) ● GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas are open to wind energy development)
Energy development—solar energy	● PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) ● IHMA: Avoidance area (may be available for solar energy development with special stipulations) ● GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas are open to solar energy development)
Infrastructure—major ROWs	● PHMA: Avoidance area (may be available for major ROWs with special stipulations) ● IHMA: Avoidance area (may be available for major ROWs with special stipulations) ● GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	● PHMA: Avoidance area (may be available for minor ROWs with special stipulations) ● IHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	● SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	● PHMA: Closed area (not available for nonenergy leasable minerals, however, expansion of existing operations could be considered if the disturbance is within the cap and subject to compensatory mitigation.
Mining—salable minerals	● PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Improper Livestock grazing	● Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and

	ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. ● Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	● Prioritize gathers in SFAs, followed by other PHMAs. ● Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. ● Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	● Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. ● Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas.
Recreation	● PHMA and IHMA: Do not construct new recreation facilities unless required for health and safety purposes or if the construction will result in a net conservation gain to the species. ● Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. ● PHMA & GHMA: OHV use limited to existing routes (routes to be designated through future travel management planning). The Utah ARMPA does retain two areas as open to OHV use in PHMA.
Fire	● Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. ● Restrict the use of prescribed fire for fuel treatments. ● Prioritize post-fire treatments in SFAs, other PHMAs, IHMAs, and GHMAs.
Nonnative, invasive plant species	● Improve GRSG habitat by treating annual grasses. ● Treat sites in PHMA, IHMA, and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	● PHMA: Maintain all lands capable of producing sagebrush with a minimum of 15 percent sagebrush canopy cover, or as consistent with specific ecological site conditions. ● All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper	● Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.

expansion	
Agricultural conversion and exurban development	- GRSG habitat will be retained in federal management unless: (1) the agency can demonstrate that disposal (including exchanges) of the lands will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal (including exchanges) of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse.

1.6 Key Components of the BLM Greater Sage-Grouse Conservation Strategy

The ARMPAs were developed to meet the purpose and need to conserve, enhance, and restore GRSG and their habitat by eliminating or minimizing threats to GRSG habitat identified in the 2010 listing decision and highlighted in the "background and purpose" section of the COT report. Consequently, consistent with guidance contained in the COT and NTT Reports, four essential components of the GRSG conservation strategy were identified: 1) avoiding or minimizing new and additional surface disturbances, 2) improving habitat conditions, 3) reducing threats of rangeland fire to GRSG and sagebrush habitat in the Great Basin, and 4) monitoring and evaluating the effectiveness of conservation measures and implementing adaptive management as needed.

The land allocations and management actions included in the ARMPAs incorporate these components and are summarized below.

1.6.1 Avoid and Minimize Surface Disturbance

Land Allocations and Habitat Protection/Surface Disturbance Measures

The four Great Basin ARMPAs build on the designated habitat management areas described in **Section 1.5** by applying management actions to these areas to avoid and minimize disturbance associated with proposed projects as described below and shown in **Table 1.4**. Land use plan allocations specify locations within the planning area that are available or unavailable for certain uses and also prioritize conservation and restoration management actions applied to habitat management areas.

~~Through this ROD, the BLM adopts those portions of the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah EISs applicable to National Forest System lands, pursuant to the provisions of 40 CFR 1506.3(c). The EISs sufficiently disclose and analyze all environmental issues associated with mineral leasing and provides support to the BLM to authorize mineral leasing in USFS administered lands, should consent be provided by or consultation be required with the USFS prior to issuance of a lease, in compliance with applicable mineral leasing and NEPA regulations, and subject to further site-specific environmental analysis where applicable.~~

The COT report notes that “loss and fragmentation of sagebrush habitats is a primary cause of the decline of sage-grouse populations”. (COT, p 9). While ~~S~~surface disturbance associated with development in the Great Basin is not yet as significant a threat to GRSG and its habitat as rangeland fire and invasive species~~. Nevertheless~~, the BLM ARMPAs include land allocations and management actions that avoid and minimize surface disturbance in PHMA for identified threats (e.g., energy, mining, infrastructure, improper grazing, free-roaming equids, recreation and urbanization). These land allocations and management actions are necessary because the location and extent of habitat loss to fire is difficult to predict and much of the habitat due to low precipitation in the Great Basin is difficult to restore once lost. Further, even a small amount of development in the wrong place could have an outsized impact in these landscapes.

Comment [JRL1]: Should include this in the RM ROD as this point as well.

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The most restrictive allocations include requirements to avoid and minimize additional disturbance in SFAs, which are subset of PHMA, where surface disturbance from fluid mineral development is avoided by NSO without waiver, modification, or exception. In addition, these areas will be recommended for withdrawal to address the risk of disturbance due to mining.

In PHMAs outside of SFAs new fluid mineral leasing would be subject to NSO with no waivers or modifications. Exceptions would be granted only if the proposed action would not have direct, indirect, or cumulative effects on GRSG or its habitat; or, if the action is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. This is fully consistent with guidance in the NTT report which states, “Do not allow new surface occupancy on federal lands within priority habitats” (NTT, p. 23).

Similarly, PHMA is closed to non-energy and salable mineral development (this does not apply to locatable minerals governed under the 1872 Mining Law). An exception may be granted for free-use permits and the expansion of existing active pits for salable minerals and expansion of existing non-energy leasable development under certain conditions. This exception is included because of the importance of these materials to local communities and their limited disturbance which will be offset by the mitigation requirements. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses the potential disturbance threat from coal development. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

All PHMAs will be managed as exclusion areas for commercial renewable energy development (solar and wind) with the exception of areas outside of SFAs in three counties in southeastern Oregon. The three counties in Oregon will be managed as avoidance areas. In these counties, the BLM will encourage new renewable energy development in non-habitat areas first. New rights-of-ways and development for transmission lines, pipelines, and related infrastructure would be avoided through restrictions on land use authorizations. In avoidance areas, exceptions would only be granted if it can be demonstrated that adverse impacts will be avoided or that residual impacts will be mitigated.

Comment [JRL2]: This was a part of the agreement that needs to be reflected in the plan and the ROD.

High voltage transmission lines will be avoided in PHMA. However, the planning, siting, and environmental review of a limited number of priority transmission lines (Transwest Express and portions (that are co-located with Transwest Express) of Gateway South, Gateway West and Boardman to Hemingway), which have been underway for a several years and are deemed critical to expanding access to renewable sources of energy and to improving the reliability of the western grid, will proceed through NEPA analysis of these proposed lines under separate authorization processes. Conservation measures for GRSG are being analyzed as part of those NEPA processes, which should achieve a net conservation benefit for GRSG.

While restrictions on future development in PHMA are intended to avoid or minimize additional surface disturbance, restrictions on development in GHMA are tailored to allow disturbance but with restrictions to ensure compatibility with GRSG habitat needs. In addition, mitigation to avoid, minimize, and compensate for unavoidable impacts will be required for proposed projects in GHMA. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation. (See **Table 1-3** for more details on GHMA management decisions.) Any disturbance is subject to mitigation, with the objective of first avoiding and minimizing potential impacts to GRSG or its habitat and then compensating for unavoidable impacts to GRSG or its habitat, to a net conservation gain standard for the species. This is consistent with guidance in the COT Report which states: "Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal, state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

In addition to allocations that limit disturbance in PHMA and GHMA, the ARMPAs prioritize oil and gas leasing and development outside of identified PHMAs, and GHMAs to further limit future surface disturbance and encourage new development in areas that would not conflict with GRSG. This objective is intended to guide development to lower conflict areas and as such, reduce the time and cost associated with oil and gas leasing development by avoiding sensitive areas, reducing the complexity of environmental review and analysis of potential impacts to sensitive species, and decreases the need for compensatory mitigation.

Additionally, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat, or, unless required for health and safety purposes.

In PHMA and GHMA, travel is limited to existing routes until routes are designated through the implementation travel management planning process. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning processes.

In general, all forms of new development in PHMAs and GHMAs would either be closed, excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat, ensuring that existing habitat would be protected and providing opportunities, through compensatory mitigation.

While improper livestock grazing can be a threat to GRSG habitat, grazing is not considered a discrete surface disturbing activity for purposes of monitoring and calculating disturbance. The plans address grazing management for the conservation of GRSG and its habitat by incorporating terms and conditions to achieve habitat objectives into permits and by prioritizing assessment and the review of grazing permits (see Section 1.6.2).

Disturbance Caps, Density Caps, Lek Buffers, and Required Design Features

In addition to the management actions and allocations discussed above, the ARMPAs provide further assurance that anthropogenic disturbances in PHMAs will be limited through the use of disturbance caps, density caps, and lek buffers.

A 3% anthropogenic disturbance cap in PHMA has been established in accordance with the recommendations contained in the NTT Report, and peer-reviewed literature from the Great Basin (Knick 2013). Disturbance will be calculated at two scales: first at a Biologically Significant Unit (BSU) scale determined in coordination with the state and second, for the proposed project area. BSUs are geographic units of PHMA that contain relevant and important GRSG habitat. In Oregon for example, BSUs are synonymous with PACs. These BSUs are used solely for the calculation of anthropogenic disturbance cap and in some ARMPAs, the adaptive management habitat triggers.

If 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within PHMA in any given BSU, no further discrete anthropogenic disturbances (subject to valid existing rights) will be permitted on BLM-managed lands within PHMAs in that BSU until restoration of disturbed lands brings the BSU below the cap. If the 3% anthropogenic disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap.

An exception to the 3% disturbance cap is provided in designated utility corridors for purposes of achieving a net conservation gain to the species. This exception is limited to projects which fulfill the use for which the corridors were designated (e.g., transmission lines and pipelines) within the designated width of a corridor. This exception will concentrate future ROW surface disturbance in areas of existing disturbance and avoid new development of infrastructure corridors in PHMAs consistent with guidance in the COT report. In addition, the Oregon and Nevada/Northeast California ARMPAs include variations to the disturbance cap: Oregon does not allow more than 1% new anthropogenic disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, permit exceedances of the 3% disturbance cap at the BSU and/or the project level can occur provided that the outcome results in a net conservation benefit to the species with the concurrence of the BLM, Nevada Department of Wildlife, and FWS in each exception.

In ~~For~~ Southwest Montana (the BLM's Dillon Field Office), the BLM will limit~~permit~~ disturbance to 3% until the State of Montana's Sage Grouse Plan's ~~a 5% cap, consistent with the State of Montana's Plan, once their~~ disturbance calculation methodology is instituted and is in effect at which time disturbance will be permitted up to a 5% cap. This is to recognize, as with the Wyoming Core Area Strategy, the importance of the all-lands-all-disturbances strategy that Montana plans to institute for sage grouse conservation.

Appendix E of each of the attached ARMPAs includes additional information about the methodology for calculating anthropogenic disturbance at the BSU and project scales.

The ARMPAs also incorporate a cap on the density of energy and mining facilities to encourage co-location of structures to reduce habitat fragmentation. The limit is an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT Report. If the disturbance density in the PHMA in a proposed project area is, on average, less than 1 facility per 640 acres, the project can proceed through the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density in the proposed project area is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or redesigned so facilities are co-located into an existing disturbed area, subject to applicable laws and regulations, such as the 1872 Mining Law and valid existing rights. The one facility per 640 density decision does not apply to Nevada, as described in **Section 1.7**.

In addition to any other relevant information determined to be appropriate, the BLM will further assess and address impacts from certain activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). Lek buffer distances will be applied at the project specific level as required conservation measures to address the impacts to leks as identified in the NEPA analysis. The lek buffer distances vary by type of disturbance (road, energy development, infrastructure, etc.) and justifiable departures may be appropriate as fully described in Appendix B of the ARMPAs. In both PHMA and GHMA, impacts should be avoided first by locating the action outside of the applicable lek buffer-distance(s) as defined in the ARMPAs. In PHMA, the BLM will ensure that any impacts within the buffer distance from a lek are fully addressed. In GHMA, the BLM will minimize and compensate for any unavoidable impacts to the extent possible. This approach to determining relevant lek buffer distances is consistent with the COT recommendation that "conservation plans should be based on the best available science and use local data on threats and ecological conditions."

Additionally, Required Design Features (RDFs) are required for certain activities in all GRSG habitat, including oil and gas development, infrastructure, and other surface disturbing activities and are fully described in Appendix C of the attached ARMPAs. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts to GRSG and its habitat from threats (such as those posed by standing water that can facilitate West Nile virus or tall structures that can serve as perches for predators). However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). In Nevada and Northeastern California, RDFs are also applied to their identified OHMAs.

1.6.2 Improving Habitat Condition

In addition to prescribing land use allocations and managing resource uses in order to minimize and avoid further surface disturbance, the ARMPAs identify management actions to restore and improve GRSG habitat.

The ARMPAs contain an overall habitat management objective that "In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions." To move toward this goal, the ARMPAs specify GRSG habitat objectives to be incorporated into land management programs, including wild horse and burros, grazing, and habitat restoration. These habitat objectives were developed for each of the GRSG's life history stages within each ARMPA's sub-region. These objectives will be used to meet the applicable land health standard in GRSG habitats.

The ARMPAs also include specific decisions to improve habitat conditions and meet the habitat objectives through treatment of invasive annual grasses and the removal of encroaching conifers in SFA, PHMA, and GHMA, and restoration of degraded landscapes, including those impacted by fire events (See **Section 1.6.3**.)

The BLM recognizes that improper grazing is a threat to GRSG and its habitat. Because grazing is the most widespread use of the sagebrush steppe ecosystem, the ARMPAs address improper grazing. The COT Report recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the Great Basin ARMPAs include requirements for the incorporation of terms and conditions informed by GRSG habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritize the review and processing of authorizations and field checks of grazing permits, and take numerous actions to avoid and minimize the impacts of range management structures (**see Table 1-4**).

The BLM will prioritize reviews and processing of grazing authorizations, as well as field checks of grazing permits in the habitat that is most important to GRSG populations: first in SFAs, then PHMAs, followed by GHMA, focusing first on riparian and wet meadows. The decision to prioritize in this way does not indicate that grazing is more of a threat or is an incompatible use in any given area, but rather reflects a decision to prioritize resources to ensure permittees and the BLM manage grazing properly in those areas most important to GRSG. If the BLM finds that relevant habitat objectives are not being met due to improper grazing, the BLM will work with the permittee to ensure progress towards habitat objectives.

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will focus on maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives, including completing rangeland health assessments, prioritizing gathers and population growth suppression techniques, and developing or amending Herd Management Area (HMA) plans to incorporate GRSG habitat objectives and management considerations. The BLM will prioritize WHB management first in SFAs, then the remainder of PHMA, and then GHMA. In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.

During the implementation of the ARMPAs, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in GRSG habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain (the actual benefit or gain above baseline conditions) to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action. This standard is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0* published by the FWS in September, 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse"**.** Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate) and be implemented on BLM-managed lands in a manner consistent with Departmental guidance for landscape mitigation pursuant to Secretarial Order 3330. If impacts from BLM management actions and authorized third party actions result in habitat loss and degradation that remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.

To help achieve the mitigation goal of net conservation gain across the range, the BLM will establish GRSG Conservation Teams based on WAFWA Management Zones, including members from the respective states, Forest Service, FWS, and NRCS. These Conservation Teams will facilitate cross-state issues, such as regional mitigation and adaptive management monitoring and response. These Teams will convene to advise on these specific tasks and will utilize existing coordination and management structures to the extent possible.

With regard to the threat of climate change, the ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further these goals and objectives. The Fire and Invasives Assessment Team (FIAT) assessments that informed the ARMPAs and supported the development of the Integrated Rangeland Fire

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Management Strategy were designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat will increase, thus contributing to increased climate resilience. The SFAs in particular, were identified as key areas to conserve as climate changes. The Oregon ARMPA commits to use climate change science concerning projected changes in species ranges and changes in site capability to adjust expected and desired native species compositions as that information becomes available.

1.6.3 Reducing Threats of Rangeland Fire to GRSG and Sagebrush Habitat

The COT emphasized that "rangeland fire (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency". For this reason, the ARMPAs seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used except under the following conditions: the NEPA analysis for the Burn Plan provides a clear rationale for why alternative techniques were not selected as a viable option, how GRSG habitat management goals and objectives would be met by its use, how the COT Report objectives would be addressed and met, and a risk assessment is prepared to address how potential threats to GRSG habitat would be minimized.

The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers, et al., 2014b). The final FIAT process report was completed in June 2014 by the Fire and Invasive Assessment Team. The BLM, the Forest Service, FWS, and other cooperating agencies agreed to incorporate this approach into the ARMPAs. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats.

Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks. Through guidance in the ARMPAs supplemented by the *Integrated Rangeland Fire Management Strategy*, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.

In addition to and complementing the ARMPAs described in this ROD, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department"** (emphasis added). The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes, which are identified by the Fire and Invasives Assessment Tool (FIAT) for the Great Basin Region, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT Assessments provide a list of findings, recommendations, and considerations to protect, maintain, and enhance GRSG habitat. The Assessments also apply recent science and identify highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rangeland Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

Comment [JRL3]: Not "Rural"?

1.6.4 Monitoring, Evaluation, and Adaptive Management

The COT Report noted that "a monitoring program is necessary to track the success of conservation plans and proactive conservation activities. Without this information, the actual benefit of conservation activities cannot be measured and there is no capacity to adapt if current management actions are determined to be ineffective." The NTT further notes that "Monitoring is necessary to provide an objective appraisal of the effects of potentially positive conservation actions, and to assess the relative negative effects of management actions to sage-grouse populations and their habitats."

A rangewide monitoring and evaluation framework will be established and implemented as described in the Monitoring Framework (Appendix D of each attached ARMPA). This monitoring strategy has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can determine how management decisions and actions implemented through the ARMPAs affect GRSG habitat to determine if the desired management objectives (e.g. avoiding and minimizing additional surface disturbance in PHMAs) have been achieved. Understanding the effectiveness and validating results of ARMPA management decisions is an essential part of the GRSG conservation strategy and provides the means for determining if desired outcomes are being achieved.

Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions. The WAFWA Zone GRSG Conservation Team (as described in Section 1.6.2) will also be used to advise regional monitoring strategies and data analysis as described in the plans.

Each ARMPA includes an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are habitat and population thresholds and are based on the two key metrics that are being monitored - habitat condition and/or population numbers. At a minimum, the BLM will assess annually whether hard and soft trigger thresholds have been met when the population or habitat information becomes available, beginning after the issuance or signature of this ROD.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the ARMPAs, the BLM will implement more conservative or restrictive conservation measures on a project-by-project basis to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each ARMPA, a soft trigger begins a dialogue between the state, FWS, and the BLM to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a “hard” trigger (which signals more severe habitat loss or population declines).

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs. In the event that a hard trigger is tripped, the BLM will implement plan-level decisions, such as allocation changes, to immediately institute greater protection for GRSG and its habitat. If a hard trigger is tripped in a PAC that crosses state boundaries, the WAFWA Management Zone GRSG Conservation Team will convene to discuss causes and ~~advise on~~ identify potential responses.

Comment [JRL4]: They need to act, not simply “advise”.

In the event that new scientific information becomes available demonstrating that the hard trigger response is insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs, the BLM will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an Instruction Memorandum (IM) or a plan amendment.

1.7 Unique Aspects of the Great Basin ARMPAs

The ARMPs and ARMPAs and their associated EISs were developed through four planning efforts across the Great Basin Region (as described in Section 1.1). To develop these plans, the BLM employed a landscape-scale approach to achieve a common set of management objectives across the range of GRSG recognizing, in particular, implementing measures to limit anthropogenic disturbance in important habitats. Within this framework, management actions were developed and incorporated into the plans that are tailored to achieve these objectives and accommodate differences in resource conditions, severity of threats, and state-specific management approaches.

This flexible landscape approach provided the opportunity to incorporate recommendations resulting from collaboration with local cooperators and public comments in each planning area. The plans and their future implementation is strengthened by the contributions of local partners and their knowledge, expertise, and experience.

Measures incorporated into the plans remain consistent with the range-wide objective of conserving, enhancing, and restoring GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat, such that the need for additional protections under the ESA may be avoided.

Below is a brief description of the unique aspects of each of the Great Basin Region's ARMPAs.

Idaho and Southwestern Montana

The Idaho and Southwestern Montana ARMPA adopted specific aspects of the State of Idaho's Conservation Plan for GRSG. The most significant aspect adopted from the State's plan is a third category of habitat referred to as Important Habitat Management Areas (IHMA). IHMA are BLM-administered and National Forest System lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations. In a landscape that is most threatened by fire and invasive species, this three-tiered approach allows land managers to focus suppression and restoration resources on those areas of highest importance while providing an acceptable additional level of flexibility in IHMA and GHMA since surface disturbance due to development is not as great a threat to habitat in the sub-region. The three tiers also serve as the foundation for an adaptive management approaches that includes habitat and population hard and soft triggers. The adaptive management approach requires that when a hard trigger is reached, IHMA will be managed as PHMA to maintain sufficient PHMA to support GRSG populations.

The Idaho portion of the Idaho and Southwestern Montana GRSG ARMPA also includes a unique approach to calculating disturbance to account for effective habitat, as described in Appendix E of the attached Idaho and Southwestern Montana ARMPA, which was developed by the BLM in concert with the Idaho Department of Fish and Game, Forest Service, and FWS. The Idaho and Southwestern Montana ARMPA also includes additional Required Design Features (RDFs) based on lek avoidance distances, which were developed in coordination with the Idaho Department of Fish and Game and the local FWS office. Examples include avoiding building new wire fences within 2 km of occupied leks and placing new, taller structures out of line of sight or at least one kilometer from occupied leks. The BLM will also work with the state of Idaho in setting priorities for the review and processing of grazing permits/leases in SFAs consistent with the methodology recommended by the State of Idaho in its proposed plan for the management of BLM-administered lands in the state.

On August 7, 2015, the Sawtooth National Recreation Area and Jerry Peak Wilderness Act (H.R. 1138) was signed into law. In accordance with the Wilderness Act (16 U.S.C. 1131 *et seq*.), certain Federal lands in the Challis National Forest and Challis District of the Bureau of Land Management in the State of Idaho, were designated as wilderness, as a component of the National Wilderness Preservation System, known as the Jim McClure-Jerry Peak Wilderness. Approximately 12,430 acres of this wilderness area fall within BLM-administered PHMA (as a subset of SFA). The ARMPA decisions for this area will be managed consistent with the Wilderness Act. As specified in the Sawtooth National Recreation Area and Jerry Peak Wilderness Act, a wilderness management plan will be developed within 5-years of the signing of the Act and it will outline specific management guidance for the new wilderness area.

This bill also released the Jerry Peak West, Corral-Horse Basin, and Boulder Creek Wilderness Study Areas (WSAs) and they are no longer subject to management pursuant to Section 603(c) of the FLPMA. The acres released as WSA include approximately X acres of PHMA, X acres of IHMA, and X acres of GHMA. The ARMPA decisions for these areas will not change as a result of the release.

Finally, in accordance with the Recreation and Public Purposes Act, the Sawtooth National Recreation Area and Jerry Peak Wilderness Act also conveyed public lands to Blaine County, Custer County, the City of Challis, the City of Clayton, and the City of Stanley. This conveyance included approximately 35 acres of PHMA, 10 acres of IHMA, and 828 acres of GHMA that are reflected in the ARMPA as being administered by the BLM. Through future plan maintenance, the BLM will adjust the maps and acres as they appear in the ARMPA to depict that these lands are not subject to the management decisions outlined in the Idaho and Southwestern Montana GRSG ARMPA.

The decisions affecting Southwestern Montana in the ARMPA consistent with the objectives of the Montana Sage Grouse Habitat Conservation Program (Montana Office of the Governor Executive Order No. 10-2014) by establishing conservation measures and strategies to minimize disturbance and habitat loss, particularly as a result of surface disturbance from energy exploration and development. The BLM plan will permit the disturbance limit to go from a 3% to a 5% disturbance cap, consistent with the Montana Plan when the process for implementing their disturbance calculation methodology is instituted and effective. Additionally, if the BLM finds that the State of Montana is implementing an effective GRSG habitat conservation program, the BLM would review their management actions to determine if additional sage-grouse related management actions should be adjusted with coordination from the State of Montana and the FWS to achieve consistent and effective conservation across all lands, regardless of ownership.

Nevada and Northeastern California

The Nevada portion of the Nevada and Northeastern California ARMPA is unique from other Great Basin ARMPAs because of how the sub-regional habitat map was developed. The ARPMA uses the "2014 Coates Maps", developed locally using the best available science, and included "Other Habitat Management Areas", where required design features will be applied at the project level. Decisions for BLM-administered lands in the State of California include allocations and management direction that is generally similar to other ARMPAs in the Great Basin, while carrying forward some decisions identified in the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).

Decisions for BLM-administered lands in the State of Nevada incorporate key elements of the State of Nevada Greater Sage-Grouse Conservation Plan (State of Nevada 2014) including consideration of the State of Nevada Conservation Credit System (Nevada Natural Heritage Program and Sagebrush Ecosystem Technical Team 2014) as the ARMPA is implemented and as projects are proposed within the planning area. This mitigation strategy focuses restoration efforts in the key areas most valuable to the GRSG. The ARMPA adopts a Disturbance Management Protocol (DMP) to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, State of Nevada, and FWS. The plan provides for this exception due to the development of mitigation tools in Nevada, including the Conservation Credit System, in collaboration with the FWS. Furthermore, given the concurrence of the Nevada Department of Wildlife and FWS in each exception, this approach is consistent with conservation objectives. The Disturbance Management Protocol in BLM-administered lands in Nevada was also deemed sufficient such that the Nevada ARMPA does not utilize a disturbance density cap, which is required in the three other Great Basin Region ARMPAs.

In coordination with the FWS, the Nevada ARMPA also allows for an exception to the geothermal NSO which is an energy development priority for the state and is projected to create very limited disturbance in predictable areas over the life of the plan. For those reasons, this exception is consistent with overall conservation objectives.

Utah

The Utah ARMPA incorporates a number of key strategies for GRSG conservation developed by the State of Utah (Conservation Plan for Greater Sage-Grouse in Utah) and the State of Wyoming (Executive Orders 2011-05 and 2013-3), which establishes conservation measures for protecting GRSG and also focuses conservation and restoration within key areas deemed most valuable to GRSG. The Utah ARMPA also integrates the state's strategic focus on increasing areas available to GRSG through vegetation treatments and reducing threats from wildfire. The ARMPA provides additional flexibility for development in GHMA because 96% of the breeding GRSG in Utah are within PHMAs where conservation measures are applied in a more targeted manner at the project-implementation stage through the use of lek buffers and required design features as well as requiring that compensatory mitigation achieve a net conservation benefit outcome. As such, the Utah ARMPA designates GHMA as open to wind energy and high voltage transmission ROW development (consistent with the net-conservation-gain mitigation framework for the ARMPA). The Utah ARMPA also designates GHMA open to oil and gas development with standard constraints.

Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat.

Oregon

The Oregon ARMPA incorporates key elements of the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Hagen 2011) which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. The BLM plan adopts the unique disturbance cap approach developed with the State of Oregon in which disturbance is capped at 1% per decade, in addition to the 3% cap in BSUs and project analysis areas.

The BLM Oregon plans provide additional flexibility for wind development in PHMA in Harney, Lake, and Malheur counties by allowing avoidance rather than exclusion within PHMAs that are outside of the SFAs. The BLM provided this flexibility after recognizing the extent of high and medium potential wind areas in these counties that is in PHMAs, the fact that wind energy is excluded in SFAs in these counties, and, after coordination with the USFWS, determining that the more rigorous disturbance cap (in which disturbance is capped at 1% per decade) and adaptive management triggers adopted by the Oregon plan would compensate for the limited wind development likely to occur in these areas. In addition, the plan encourages development of wind energy ROWs outside of PHMA first, or in non-habitat areas within PHMA, before development is permitted in higher value habitat areas. Due to these factors, the BLM finds these limited areas of flexibility for wind development are not inconsistent with overall conservation objectives of the plan. In addition, the Oregon ARMPA identifies strategic areas where habitat enhancement and restoration activities are encouraged, as well as other strategic areas to address the impacts associated with climate change.

For additional information regarding the unique aspects of each plan, refer to Table 1-6 of the attached Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah ARMPAs, which provides a crosswalk regarding how the ARMPAs address specific threats to GRSG identified in the COT Report through these state-specific management prescriptions.

1.8 Decision Rationale

The ARMPAs provide a comprehensive and effective conservation strategy for addressing the threats identified by the FWS such that the need for additional protections under the ESA may be avoided. The ARMPAs contain objectives which strive to conserve the GRSG and its habitat on BLM-administered lands across the remaining range of the species consistent with measures identified or recommended in the NTT or COT reports.

In combination with the sage-grouse conservation actions taken by the individual states within the remaining range of the species and separate but connected initiatives to address the threat of rangeland fire to curb the continuing spread of non-native invasive grasses, and to promote conservation measures to benefit the Greater sage-grouse on private lands, the BLM and Forest Service proposed ARMPAs are an essential component of the effort to conserve the GRSG and its habitat. Combined, all of the ARMPAs associated with the BLM's National GRSG Conservation Strategy would affect approximately 66 million acres of the remaining habitat for the species.

The BLM Greater Sage-Grouse Conservation Strategy is built upon the following key concepts:

- **Landscape-level**: The planning effort encompasses the remaining habitat of the GRSG on BLM-administered public lands, covering 10 western states in the Great Basin and Rocky Mountain regions. As such, the strategy provides a coherent framework across the BLM RMPs to implement landscape-level conservation for GRSG while allowing for flexibility essential to effectively address threats to the GRSG in the context of the agency's multiple use and sustained yield mandates under FLPMA. The conservation measures included as part of this landscape-level conservation effort ~~appropriately~~ address identified threats to the species, recognizing local ecological conditions, and incorporating existing conservation efforts where they are consistent with the overall objective of conserving the ~~species~~ Greater sage-grouse across its remaining range.
- **Best Available Science** – The ARMPAs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT Report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat. The BLM National Technical Team (NTT) Report provided additional guidance for addressing the most significant threats to the GRSG. A series of subsequent reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the WAFWA, as well as a report to the Secretary of the Interior entitled "An Integrated Rangeland Fire Management Strategy" also informed the GRSG conservation.
- **Targeted, Multi-Tiered Approach** – The ARMPAs were designed to incorporate a layered management approach to target habitat protection and restoration efforts to the most important habitat management areas as determined by state and federal sage grouse experts, largely consistent with the Priority Areas for Conservation (PACs) identified in the COT Report, where land allocations and management direction avoid and minimize additional surface disturbance. These areas are designated as Priority Habitat Management Areas (PHMAs). Within PHMA, the ARMPAs/ARMPs provide an added level of protection to eliminate most surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. General Habitat Management Areas (GHMAs), recognize the potential value of habitat areas outside of PACs -- as recommended by the COT -- where surface disturbance is minimized ~~to~~ while providinge ~~greater~~ flexibility for other land resource use ~~activitie~~s.
- **Coordinated**: The ARMPAs were developed through a joint planning process between the BLM and the Forest Service (as a cooperating agency). As a result, federally-administered lands ~~are~~ essential to the conservation of the GRSG are managed in a coordinated manner. The FWS provided guidance and input throughout the process to aid land managers in understanding the

Comment [JRL5]: Important element in both "rationales".

threats to the GRSG and its habitat. The USGS and NRCS also provided key technical and scientific support.

- **Collaborative**: The ARMPAs reflected extensive input from the relevant states, collaborators, and stakeholders and the public from the outset. The ARMPAs were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Western Governors Association Sage Grouse Task Force (SGTF) was particularly useful in facilitating this kind of collaborative input. The ARMPAs incorporate state and local conservation measures where they are consistent with the overall objective of implementing land use plan conservation measures for the GRSG consistent with the multiple-use and sustained-yield mission of the BLM.

The conservation measures in the ARMPAs reflect over a decade of research, analysis and recommendations for GRSG conservation including those produced by the WAFWA, the NTT, and the COT. Each of these entities produced a strategy or report that was developed through a collaborative effort of state and federal biologists and scientists with extensive experience and expertise in GRSG management and research.

The COT Report –which identified threats to GRSG habitat as well as the most important habitat to protect--provided an important framework for development of the conservation strategy embodied in the sub-regional ARMPAs. The COT, consisting of state and federal scientists, wildlife biologists, ~~and~~ resource managers, and policy advisors, was tasked by the Director of the FWS "with development of range-wide conservation objectives for the sage-grouse to define the degree to which threats need to be reduced or ameliorated to conserve sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future."

In addition, the Fire and Invasives Assessment Team (FIAT) Report and the USGS compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on GRSG populations -- *Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review*, and the *Integrated Rangeland Fire Management Strategy: Final report to the Secretary* (Manier et al, 2014; DOI 2015b) provided important guidance in the development of critical aspects of the proposed ARMPAs/ARMPs and the overall GRSG landscape-level conservation strategy. Beyond these range-wide reports, each of the sub-regional plans used local science, where available, to tailor plan elements to reflect local ecological conditions, threats, and GRSG experience where consistent with the overall GRSG management objectives.

The BLM ARMPAs are the product of extensive coordination, including the active engagement of the FWS in helping to inform land allocation and related management decisions by the land management agencies to ensure they limit or eliminate new surface disturbance as well as improve habitat condition in the most important habitat areas. The ARMPAs/ARMPs also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, approaches, and priorities in each. While the effort to incorporate state-developed conservation measures in each of the sub-regional plans has added complexity in developing the overall conservation strategy, the body of local knowledge and expertise regarding conservation measures for the GRSG is extensive and, ultimately, strengthened the plans. Incorporating these measures in the plans is also likely to increase the commitment of all partners to the difficult task of implementing the plans upon completion.

In his transmittal letter accompanying the final COT report, FWS Director Dan Ashe reaffirmed his charge, "I asked the team to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. … Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."

The ARMPAs are designed to directly address the specific threats to the species identified by the FWS in its 2010 listing determination as more fully explained in the COT Report~~,~~ and the BLM NTT Report~~, and coordination with state and local working groups~~. As previously noted, the COT Report stated, "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation." Specifically, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT further recommended an "avoidance first strategy" and stressed that "threats in PACs must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

Comment [JRL6]: Strike as explained in RM ROD.

In order to address the identified threats and meet the recommendations of the COT, the plans are based first on the identification of important habitat areas for GRSG in which the plans protect remaining habitat and target habitat restoration and improvement actions. Specifically, the plans identify PHMA which align closely with PACs identified in the COT Report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report). Within PHMA, the plans identify SFAs based on the FWS analysis of strongholds for the species based on population density, habitat integrity, and resilience to climate change among other factors. The SFAs serve as a landscape-level anchor for the conservation strategy and are closed or excluded from discretionary surface disturbances. SFAs are also used to prioritize fire protection, habitat restoration, and other habitat management actions (e.g., prioritizing reductions in wild horse and burro populations to achieve AML). This approach will allow the BLM to target limited resources to those areas identified by the FWS which are most important to long-term ecosystem health and species persistence.

PHMA and GHMA boundaries are based on Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) (except in Utah, where PPH was derived from occupied habitat). Consistent with BLM's Instruction Memorandum 2012-044, PPH and PGH are based on data and maps developed through a collaborative effort between the BLM and the respective state wildlife agency. PPH and PGH (PHMA and GHMA in the Final EISs and now the ARMPAs) were developed using the best available data. Criteria for delineating PPH included breeding bird density (Doherty 2010), sage grouse proportionality, density of leks, and key seasonal habitats, such as known winter concentration areas. PGH (now GHMA) are areas of occupied seasonal, connectivity, or year-round habitat outside of PPH.

Allocations and management actions are targeted to habitat management areas to limit or eliminate surface disturbance. All forms of new development in PHMA – from energy, to transmission lines, to recreation facilities and grazing structures are excluded, avoided, or allowed only if the resultant effect is neutral or beneficial to the GRSG. In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated with habitat protection or restoration activities that produce a net conservation benefit for the GRSG. The ARMPAs/ARMPs will also prioritize future oil and gas leasing and development outside of identified GRSG habitat management areas (i.e., SFAs, PHMAs, and GHMAs) to reduce the potential for future conflict with GRSG.

In addition, the ARMPs and ARMPAs include measures to limit surface disturbance in PHMA through the establishment of disturbance limits or "caps" and density restrictions of on average 1 energy facility per 640 acres, as well as lek buffers. These requirements reflect recommendations contained in the NTT Report and are consistent with certain state strategies that were already in place before the initiation of the BLM's National GRSG Conservation Strategy. As described in Section 1.6.1, BLM determined the appropriate lek buffers to analyze based on the USGS report *Conservation Buffer Distance Estimates for GRSG – A Review* (Manier et al, 2014) based on best available science.

The plans also include actions meant to improve habitat condition to the most important areas for conservation through additional, targeted efforts to protect and restore habitat first in SFAs, then in PHMAs, and finally in areas designated as GHMAs.

Mitigation for activities adversely impacting GRSG or GRSG habitat in PHMA or GHMA will be designed to a net conservation gain standard consistent with the recommendation included in the September 2013 FWS document, *Greater Sage-Grouse Range-Wide Mitigation Framework*. According to the authors, the Framework was prepared …

> "to communicate some of the factors the Service is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to GRSG. The recommendations provided here are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report for sage-grouse".

Grazing, which is the most widespread use of the sagebrush ecosystem, will continue in a manner consistent with the objective of conserving the GRSG. Land health standards will incorporate GRSG habitat objectives and vegetative management objectives consistent with the ecological potential of the landscape as recommended by the COT to …

> "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for GRSG (e.g. shrub cover, nesting cover)."

The ARMPAs also address the adverse impacts of free-roaming equids (wild horses and burros) on GRSG habitat by prioritizing gathers and removal of wild horses and burros to achieve AMLs in SFAs, PHMAs, and GHMAs (in that order). The BLM has been working with the National Academy of Sciences to conduct new research of methods to reduce wild horse and burro reproduction rates. Through a combination of targeted gathers and the development of an effective agent for controlling future free-roaming equid reproductive rates, over time, this threat to GRSG may be effectively managed.

Since the interaction of fire and invasive species represents the greatest threat to GRSG survival in the Great Basin region, the ARMPAs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire, including fire prevention and the restoration of habitats impacted by fire. The Department took a series of actions over 2014 and 2015 to develop a more complete and comprehensive strategy for dealing with this threat that led to Secretarial Order (S.O.) 3336 and subsequent report, *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary of the Interior*.

http://www.forestsandrangelands.gov/rangeland/documents/IntegratedRangelandFireManagementStrategy_FinalReportMay2015.pdf

In accordance with the S.O. and subsequent rangeland fire management strategy, substantial changes in policy and management direction affecting all aspects of the rangeland fire management program – from better coordination between resource managers and fire management officers; to the identification and prioritization of prevention, suppression, and restoration efforts in SFAs, PHMAs, and GHMAs; to the commitment of additional equipment and crews for rangeland firefighting; to additional funding and policy direction to improve post-fire restoration; to the completion of an initiative to collect, store, and better utilize native seed and sagebrush in post-fire restoration of sagebrush steppe ecosystems. This effort, and the initiative to fight the spread of non-native invasive species that contributes to higher rangeland fire risk (e.g. cheatgrass) discussed below, has fundamentally changed how rangeland fire is managed to benefit sagebrush ecosystems and GRSG habitat.

The COT report – and other more recent research and analysis – amplify concern for the contribution of cheatgrass and other invasive annual species to the loss of GRSG habitat associated with increased fire frequency and intensity. Work initiated by the WAFWA and based on recent research by Chambers (Chambers et al, 2014b) led to the development of the Fire and Invasives Assessment Tool (FIAT) and a subsequent assessment that identified areas of resistance and resilience to fire within SFAs, PHMAs, and GHMAs. Through use of the FIAT Assessment/Tool, land managers can more efficiently allocate and use fire resources at initial attack, to stop fire early and prevent catastrophic habitat loss as well as target restoration to those areas important to the species where success is more likely. The BLM is also committed to and accelerating the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasive annual species.

Even prior to completion of the FIAT assessment, BLM shifted funding for fuels management to protect landscapes of importance to the GRSG. Under the FY2014 Omnibus Appropriation, BLM prioritized the funding of treatments and activities within each state that benefit GRSG (See **Figure 1-6)**.

In addition, the Sage Grouse Initiative (SGI) launched by the Natural Resources Conservation Service in 2010 also contributes to the effort to protect and restore important GRSG habitat. In collaboration with the states and private landowners on private lands, as well as with the BLM and USFS on federally-administered public lands, NRCS has worked to reduce the encroachment of pinyon-juniper trees and restore rangeland habitat on private and BLM-administered lands.

[Insert Figure 1-6. FY 2015 FIAT Priority Project Planning Areas with Focus on Invasive Annual Grasses and Conifer Expansion Assessments.]

To further supplement these efforts, the Department has recently committed $7.5 million to projects in

GRSG habitat to create more resilient landscapes and BLM has allocated $12 million to increase firefighting resources aimed at stopping fires while they are small in the Great Basin. The Department has identified required policy changes to increase the commitment, flexibility and timeframe for use of Emergency Stabilization and Burned Area Restoration (ES & BAR) funding on priority sagebrush-steppe habitats.

Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy,* the BLM and Forest Service conservation strategy places heavy reliance on monitoring and evaluation to assess the success and effectiveness of implementing the management decisions in the ARMPAs. Monitoring plans will be developed in coordination with relevant state and federal agencies and will incorporate evaluation of GRSG population trends by the states and changes in habitat condition by the federal land management agencies. As the WAFWA report states …

> Monitoring provides the "currency" necessary to evaluate management decisions and to assess progress or problems. Adequate monitoring should be considered an integral and inseparable component of all management actions, and there, not optional. Lack of proper monitoring will undoubtedly hinder this large-scale conservation effort.

In addition, the ARMPAs incorporate an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should changes in population levels or habitat conditions occur. If the project-level management responses to soft triggers do not adequately address the causes for population or habitat declines and "hard triggers" are reached, the ARMPAs identify measures that will be put in place, including plan-level responses, in an effort to reverse the declines.

In summary, the ARMPAs emphasize an "avoidance first strategy" consistent with the recommendations in the COT Report by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is accomplished through identification of important GRSG habitat areas and then applying allocations that exclude or avoid surface disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which although more difficult and requiring a longer time frame, are important to the long-term conservation of GRSG. Restoration decisions include specific habitat objectives, and a priority on treating GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* as well as NRCS' Sage Grouse Initiative (SGI) investments in private landowners' conservation efforts. This strategy reflects a high level of commitment by federal partners to conserve the GRSG and its habitat. These actions on over half of the most important lands for GRSG conservation will serve as an anchor and complement the significant actions being taken by state and local governments as well as private landowners to conserve the species and its habitat.

The landscape-level strategy consisting of new conservation actions that will go into effect through the BLM ARMPAs as well as actions being implemented currently to conserve the species, reflect a significant change in management direction and philosophy for both resource management agencies since

2010 and a long-term commitment to assure the conservation of the species consistent with the objectives set in the 2006 WAFWA conservation strategy and embraced by both the NTT and the COT.

This change represents a new paradigm in managing the sagebrush landscape for the BLM and amplifies the need for collaboration among federal, state, tribal, and private partners to conserve the GRSG consistent with direction articulated in the NTT report:

"Land uses, habitat treatments, and anthropogenic disturbances will need to be managed below threshold necessary to conserve not only local sage-grouse populations, but sagebrush communities and landscapes as well. Management priorities will need to be shifted and balanced to maximize benefits to sage grouse habitats and populations in priority habitats. Adequacy of management adjustments will be measured by science-based effectiveness monitoring of the biological response of sagebrush landscapes and populations. Ultimately, success will be measured by the maintenance and enhancement of sage-grouse populations well into the future."

The conservation benefits to the sagebrush ecosystem and GRSG habitats resulting from the BLM ARMPs and ARMPAs provide an essential foundation for conserving the GRSG which, in conjunction with the amended Forest Service LRMPs, affect nearly two-thirds of GRSG habitat across the remaining range of the species. In conjunction with similar conservation efforts by other federal and state agencies, private landowners, and local partners, the BLM National GRSG Conservation Strategy constitutes an historic conservation effort that will benefit more than 350 species and the sagebrush ecosystem upon which they depend. It is through ~~These~~ collaborative efforts to conserve the ~~vulnerable~~ imperiled sagebrush ecosystem that ~~can best achieve~~ conservation of the GRSG and other sagebrush obligate species can best be achieved and the listing of the Greater sage-grouse under the ESA may be avoided.

Comment [JRL7]: I suggest this closing paragraph for both RODs. Makes the point that ecosystem conservation is the best chance to avoid a listing… without saying it will.

1.9 Implementation

1.9.1 Additional Implementation Guidance and Considerations

Continued commitment to research and use of best available science: Through implementation of this strategy, new management issues and questions are likely to arise that may warrant additional guidance and/or study by technical experts, scientists, and researchers. The BLM is committed to continue to work with individuals and institutions with expertise in relevant fields in order to ensure that land and resource management affecting conservation of the Greater sage-grouse and the sagebrush ecosystem continues to be guided by sound, peer-reviewed research and the best available science. [May want to link to DOI and/or BLM science policy]

Implementation, after a BLM RMP or RMP amendment is approved, is a continuous and active process. Decisions presented as Management Decisions can be characterized as *immediate* or *one-time future* decisions.

Immediate Decisions: These decisions are the lands use planning decisions that go into effect upon signature of the ROD. These include goals, objectives, allowable uses and management direction, such as the allocation of lands as open or closed for saleable mineral sales, lands open with stipulations for oil and gas leasing, and OHV area designations. These decisions require no additional analysis and guide future land management actions and subsequent site specific implementation decisions in the planning area. Proposals for future actions such as oil and gas leasing, land adjustments, and other allocation-based actions will be reviewed against these land use plan decisions to determine if the proposal is in conformance with the plan.

One-Time Future Decisions: These types of decisions include those that are not implemented until additional decision-making and site-specific analysis is completed. Examples are implementation of the recommendations to withdraw lands from locatable mineral entry or development of travel management plans. Future one-time decisions require additional analysis and decision-making and are prioritized as part of the BLM budget process. Priorities for implementation of "one-time" RMP decisions will be based on several criteria, including:

- Current and projected resource needs and demands,
- National BLM management direction, and
- Available resources.

General Implementation Schedule of "One-Time" Decisions: Future Decisions discussed in the attached ARMPAs will be implemented over a period of years depending on budget and staff availability. After issuing the ROD, BLM will prepare implementation plans that establish tentative timeframes for completion of "one-time" decisions identified in these ARMPs and ARMPAa. These actions require additional site specific decision-making and analysis.

This schedule will assist BLM managers and staff in preparing budget requests and in scheduling work. However, the proposed schedule must be considered tentative and will be affected by future funding, changing program priorities, non-discretionary workloads, and cooperation by partners and external publics. Yearly review of the plan will provide consistent tracking of accomplishments and provide information that can be used to develop annual budget requests to continue implementation.

1.9.1 Additional Implementation Guidance and Considerations

Instructional Memoranda – Additional instruction and management direction will be necessary to implement certain land allocation decisions and management direction included in the ARMPAs. For example, additional guidance will be provided to clarify how the Bureau will implement the objective of prioritizing future oil and gas leasing and development outside of GRSG habitat. Instructional Memoranda (IM) and related guidance will be completed by the BLM-Washington office. Presently, IMs for the following management direction are anticipated: oil and gas leasing and development prioritization, livestock grazing, monitoring, and mitigation. Issuance of this national guidance will supersede any related national and field level guidance currently in effect. Additional national, state and field level guidance will be developed as necessary to implement the decisions in the plans.

Transmission lines -- Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of a limited number of Presidential priority lines (Gateway West, Boardman to Hemingway, and Transwest Express, including those portions of Gateway South that are co-located) have been underway for a several years. These lines are critical to expanding access to renewable sources of energy (especially wind) and to improving the reliability of the Western grid, and therefore, planning for these lines is proceeding through NEPA analysis in a separate authorization process. Conservation measures for GRSG are being analyzed as part of those NEPA processes, which should achieve a net conservation benefit for GRSG. Conservation measures to achieve this may include micro-siting to adjust the route to avoid important habitat and leks, transmission tower design to minimize the potential for adverse impacts to GRSG such as perching for predators, and compensatory mitigation measures, such as habitat restoration and pre-suppression activities to reduce the risk of habitat loss due to fire, to offset any unavoidable impacts to a conservation gain standard.

Wild horses and burros – Recognizing the potential for free-roaming equids to adversely impact sage-grouse habitat, the decisions emphasizes the need to focus on maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve habitat management objectives, focusing first in SFAs and PHMAs.

Grazing – Changes in grazing management will occur when authorizations are renewed or modified to meet land health standards, including sage-grouse habitat standards. Changes will be made in accordance with regulatory processes. Therefore, there will be no immediate change in grazing management or modification of term grazing permits and leases upon signing this ROD. As stated in the ARMPAs and ARMPs, the BLM will prioritize review of livestock grazing management in SFAs and PHMAs and implement changes as needed. All BLM grazing use authorizations will contain terms and conditions regarding the actions needed to meet or make significant progress toward meeting the habitat objectives. If an evaluation of monitoring and assessment information shows that the objectives are being met or there is a trend towards meeting the objectives, then no adjustments to the current use and management is required. If the evaluation shows the habitat objectives are not met nor is there progress towards meeting them, then the cause for not meeting the objectives will be identified. If it is determined that the current authorized livestock management or level of use is a significant cause, the use will be adjusted in accordance with the response specified in the instrument that authorized the use, or as described in a NEPA document. The BLM will prioritize the review of grazing authorizations in SFA and PHMA in particular, focusing on those containing important riparian habitats and those not meeting Land Health Standards, to determine if modification is necessary prior to renewal of the authorization. Renewed or modified grazing authorizations in SFA and PHMA will include terms and conditions specifically designed to meet objectives identified in the GRSG Habitat Objectives Table based on ecological site potential and Land Health Standards. One or more defined responses to exceeding specific management thresholds will be subjected to NEPA analysis during the grazing authorization renewal or modification process, which will allow the authorized officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. The BLM will include additional management direction for implementing grazing management actions in the ARMPs in an Instructional Memorandum.

GRSG Seasonal Habitats – PHMA was designed to include breeding bird density, sage-grouse proportionality, density of leks, and key seasonal habitats, such as known winter concentration areas, and GHMA was designed to include the areas of occupied seasonal, connectivity, or year-round habitat outside of PHMA. As additional important habitats are identified, the BLM will map, and incorporate these habitats for GRSG, consistent with best available science, through subsequent plan revisions or amendments, as appropriate. Priority should be given to ensuring that wintering habitat is identified and captured in all changes in habitat maps subsequent to this decision.

Climate Change Effects on GRSG Conservation – As identified by the FWS 2010 decision and the COT report, climate change can impact efforts to conserve the GRSG and its habitat in a number of ways. While several ARMPAs acknowledge the potential impact of climate change on GRSG habitat and conservation efforts, specific strategies to address the impacts of climate change are limited. The BLM and Forest Service, in coordination with the FWS, will continue to assess the potential impacts of climate change on GRSG and its habitat and develop strategies to mitigate anticipated effects on GRSG conservation efforts. Changes to management decisions will require a plan revision or amendment, as appropriate.

Training -- Given the nature and complexity of the management direction in these ARMPAs, the BLM, in collaboration with the Forest Service and the FWS, will develop and implement a schedule of trainings for key functions, actions, and decisions associated with these plans. In this manner, the BLM will seek to better inform its personnel, partners, cooperators, and stakeholders of the changes in management that will result from this new management paradigm.

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments 1 through 4). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in **Sections 1.3** of attachments 1 through 4.

The land use decisions conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses
- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not available for certain uses and are also used to prioritize conservation and restoration management actions. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Management decisions/actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands, including but not limited to stipulations, guidelines, best management practices (BMPs), and required design features.

The ARMPAs' management decisions were crafted to incorporate conservation measures into LUPs to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing identified threats to GRSG and their habitats (see **Section 1.3**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for land use plan level travel management area decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs and ARMPs do not violate valid existing rights.

The ARMPAs do not contain decisions for the mineral estates that is not administered by the BLM. ARMPA decisions for surface estate only apply to BLM managed lands. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

- *Statutory requirements.* The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy.* The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM’s final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

The ARMPAs in the Great Basin Region include minor modifications and clarifications to the Proposed RMPs and RMP Amendments. These minor modifications and clarifications were made as a result of internal reviews, response to protests, and recommendations provided to the BLM during the Governors’ consistency review. These modifications and clarifications are hereby adopted by this ROD.

The following modifications/clarifications were made to all of the ARMPAs in the Great Basin Region.

- ARMPA Formatting: The plans were reformatted between the Proposed RMPA and ARMPA planning stages for consistency across the Great Basin Region; the order of management actions and the prefixes for the goals, objectives, and management actions were changed in the ARMPAs to provide consistency among the amendments and revisions for GRSG goals and objectives.

- U.S Forest Service References (applicable only to the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah ARMPAs): All references to National Forest System lands in both text and on maps have been removed from the ARMPAs. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plan Amendment under their planning authorities.
- Fire: Management actions/decisions were modified to stress that the protection of human life is the single, overriding priority for fire and fuels management activities.
- Livestock Grazing: The following statement, "This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3," was added to the management action/decision which reads, "At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks."
- Glossary: Numerous glossary definitions were deleted due to the fact that the terms were not used/referenced in the ARMPAs. If not already contained in the Proposed RMPAs' glossary, the following terms and definitions were added to the glossary for clarification:
  - Grazing Relinquishment: the voluntary and permanent surrender by an existing permittee or lessee, (with concurrence of any base property lienholder(s)), of their priority (preference) to use a livestock forage allocation on public land as well as their permission to use this forage. Relinquishments do not require the consent or approval by BLM. The BLM's receipt of a relinquishment is not a decision to close areas to livestock grazing.
  - Transfer of Grazing Preference: the BLM's approval of an application to transfer grazing preference from one party to another or from one base property to another, or both. Grazing preference means a superior or priority position against others for the purposes of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee.
  - Valid Existing Right: Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, rights-of-way, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.
  - Mining Claim: A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.
  - Energy or Mining Facility: Human constructed assets designed and created to serve a particular function and to afford a particular convenience or service that is

affixed to a specific locations, such as oil and gas well pads and associated infrastructure.

- GRSG Habitat Mapping: Information was added to the ARMPAs to specify that when new information becomes available about GRSG habitat, including seasonal habitats, in coordination with the state wildlife agency and FWS, and based on best available scientific information, the BLM may revise the GRSG habitat management area maps and associated management decisions through plan maintenance or plan amendment/revision, as appropriate.
- Adaptive Management: The Greater Sage-Grouse Adaptive Management Strategy was revised to include a commitment that the hard and soft trigger data will be evaluated as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.
- Vegetation: The desired condition for maintaining a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover in SFAs and PHMAs was modified to read as follows: "In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6)."
- GRSG Habitat Objectives: For clarification purposes, within each of the ARMPA GRSG Habitat Objectives Tables, native bunchgrasses was provided as an example of a perennial grass cover and the inclusion of residual grasses was added to the perennial grass cover and height objective.
- Sagebrush Focal Areas: Examples of the types of vegetation and conservation actions that will be prioritized within SFAs were provided for clarity in the management action/decision. These examples include land health assessments and wild horse and burro management and habitat restoration actions.
- Required Design Features: One of the criteria for demonstrating that a variation to an RDF is warranted was modified to include the following statement, "An alternative RDF, a state-implemented conservation measure or plan-level protection is determined to provide equal or better protection for GRSG or its habitat."
- Lands and Realty: The following management actions/decisions and objectives were calrified:
  - Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.
  - Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.
- Land Tenure: Management action associated with land disposals was clarified to include land exchanges as a means of disposal.
- WAFWA GRSG Conservation Team. Additional clarification was added to ARMPAs related to the WAFWA GRSG Conservation Teams that were identified in the Proposed RMPAs: "WAFWA management zones will be used to facilitate cross-state issues, such as regional

mitigation and adaptive management monitoring and response, through WAFWA GRSG Conservation Teams (Teams). These Teams will convene to advise on these specific tasks and will utilize existing coordination and management structures to the extent possible."

- Cheatgrass: The following management action was included consistent with the purpose and need and objectives of the ARMPAs: "Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species."
- Valid Existing Rights: The following management action was added to the ARMPs and ARMPAs: "Consider the potential for the development of not-yet-constructed valid existing rights of surface disturbing activities as defined in Table 2 of the Monitoring Framework prior to authorizing new projects in PHMA."

Additional modifications and clarifications specific to each sub-region ARMPA are summarized below.

2.4.1 Idaho and Southwestern Montana

General Changes

- All exception language that was in the FEIS in various places was grouped into a stipulation appendix and added it to the ARMPA as Appendix G Stipulations.
- Appendix G Anthropogenic Disturbance and Adaptive Management from the Proposed RMPA, which is now Appendix E in the ARMPA was modified to delete the reference to Tables 2 to 7. Tables 2 to 7 were deleted from the FEIS Appendix G before it was made available to the public for protest, but the reference was not deleted in text of the Appendix. This discrepancy was identified during protest resolution and by the Governor during the Governor's Consistency Review. These values will be calculated after the signing of the ROD (see Adaptive Management below).
- Many editorial changes including, deleting repeated numbers, spelling errors, etc, were made when finalizing the ARMPA.
- On August 7, 2015, President Barack Obama signed into law the Sawtooth National Recreation Area and Jerry Peak Wilderness Act (H.R. 1138). In accordance with the Wilderness Act (16 U.S.C. 1131 et seq.), certain Federal lands in the Challis National Forest and Challis District of the Bureau of Land Management in the State of Idaho, comprising approximately 116,898 acres, were designated as wilderness, as a component of the National Wilderness Preservation System, known as the Jim McClure-Jerry Peak Wilderness. This bill also released the Jerry Peak West, Corral-Horse Basin, and Boulder Creek Wilderness Study Areas and they are no longer subject to section 603(c) of the FLPMA. In accordance with the Recreation and Public Purposes Act, this law also conveyed public lands to Blaine County, Custer County, the City of Challis, the City of Clayton, and the City of Stanley. The new wilderness area, the release of the WSAs, and the lands that were conveyed by this law were not within the decision area of the Idaho and Southwestern Montana ARMPA, therefore, no changes to the ARMPA have been made as a result of the passage of this law.

Special Status Species

- Deleted the Seasonal Timing Restrictions from Appendix C FEIS to reduce redundancy because these restrictions were already in the Required Design Features Appendix.

Livestock Grazing

- Livestock Grazing RM-16 and RM 18, which are now MD LG 15 and MD LG 17 respectively in the ARMPA, had the following sentence added as an accepted recommendation made by the Governor during the Governor's Consistency Review to clarify management and conservation action prioritization in SFAs and: "Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFAs followed by areas of PHMA outside SFAs."

Lands and Realty

- Lands and Realty LR-14 from the Proposed RMPA, which is now MD LR 13 in the ARMPA, was modified to remove the statement that lands in PHMA, IHMA, and GHMA would only be available for disposal through exchange. This was removed because it was not consistent with BLM policy and the net conservation gain clause in MD LR-13 will provide assurance that disposals through any method would be beneficial to GRSG.

2.4.2 Nevada and Northeastern California

General Changes

- Editorial changes such as changing 'should' to 'shall', and 'would' to 'will' to reflect the final decision language.
- Re-categorizing some of the Management Decisions into other common resource programs. For example, all of the Fire and Fuels management decisions are all numbered under FIRE, and are not split into different sub-category names.
- Re-lettering of the critical Appendices, and deletion of those that are no longer applicable for the ARMPA.

Special Status Species

- Added clarity to MD SSS 2 A 3, by describing what energy and mining facilities to which this decision would apply; taken directly from the Disturbance Appendix E.
- Added clarity to MD SSS 3A, by including references to valid existing rights and applicable law for the requirement of a 'net conservation gain'.
- Specified in MD SSS 8 that this activity would be coordinated with NDOW or CDFW, and that breeding activity surveys would be for actions involving mineral activities and rights-of-ways.

- Deleted Action PR 4 from the Proposed LUPA because BLM does not manage landfills and transfer stations.

Adaptive Management

- Moved the Adaptive Management Strategy section out of Chapter 2 and made it into Appendix J; moved the Adaptive Management decisions under MD SSS 17 – MD SSS 22.
- Clarified under MD SSS 21 that BLM will coordinate with NDOW, and that the decision was specific to mineral activities and rights-of-way actions.

Fire and Fuels Management

- Deleted ‘field offices and districts’ from MD FIRE 3, as there will be a multi-layer approach to coordination, including BLM State Offices.
- In Objective FIRE 3, added ‘in SFAs first’ to provide more emphasis to the SFA over the rest of the PHMA for this action.
- Modified MD FIRE 26 to delete ‘Districts’, as there will be a multi-layer approach to identifying treatment needs for wildfire and invasive species management across the state.
- Added ‘FWS’ as a coordination entity to MD FIRE 31, when ensuring that proposed sagebrush treatments are coordinated with the BLM and State fish and wildlife agencies.

Livestock Grazing

- Management Decision LG 1 was modified for clarity and to include the fact that BLM would conduct appropriate consultation, cooperation and coordination
- Management Decision LG 5 was modified to add supplementary management actions and clarifies that the potential modifications include, “but are not limited to” to actions on the list.
- Management Decision LG 5 was modified to make it clear that the management strategies listed are not limited to just those listed under LG 5 by adding “but are not limited to”. This was added to clarify a misunderstanding in a protest letter.
- Management Decision LG 7 was clarified to state that “AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested.”
- Management Decision LG 15 was modified to state that removing or modifying water developments must be done “In accordance with state water law and…”

Mineral Resources

- Management Decision MR 18 was modified to provide the Barrick Enabling Agreement as an example of appropriate mitigation that can be considered in the future, and the last sentence was removed because it only repeated BLM regulations, and is unnecessary.

Lands and Realty

- In order to resolve a protest, MD LR 3 was modified to state that corridors will be 3,500 feet in width… "or a different width is specified for congressional designated corridors". This is in response to the Lincoln County Conservation Recreation Development Act (2204) which included congressionally designated corridors that were not included in the plan amendment or the corridor map. The corridor map (Figure 2-10) was also modified to reflect the corridors tied to this Act.
- Action LR-LUA 21 from the Proposed Plan was deleted because the Federal Highway Administration and the Nevada Department of Transportation already have valid existing rights associated with their easements and ROWs, and this planning effort would not change the terms and conditions of their existing easements or ROWs. Making this a Management Action is repetitive and unnecessary.

Travel and Transportation

- Due to confusion that was outlined in protest letters and in the Governor's Consistency Review, MD TTM 2 was clarified that limiting off-highway travel to existing routes in PHMAs and GHMAs would be "subject to valid existing rights, such as for a mine under a plan of operations".
- Additional language was added to MD TTM 3 to make it clear that the bulleted "guidelines will be considered when undertaking future implementation-level travel planning". This was in response to protest misunderstandings. In addition, bullet three was amended by deleting "developed in this plan amendment", as the criteria is not developed through the plan amendment.

Mitigation

- In order to provide consistency across the Great Basin Regional Planning area, the two Mitigation management decisions were removed from the Adaptive Management, Monitoring, and Mitigation section of Chapter 2 in the Proposed LUPA (which are now separate Appendices) and inserted as management decisions independently under the Mitigation section.

2.4.3 Oregon

Lands and Realty

- A typographical error in the socioeconomic analysis of the proposed RMPA was identified during the Protest period. Correction to this error in Section 4.20.3, page 4-345, is as follows: Paragraph beginning "Restrictions to ROW development under Alternatives B, C, D,E, F, and the Proposed Plan…" is replaced with: "Proposed management under Alternatives B, C, D, E, F, and the Proposed Plan could require investors to consider

> alternative power line ROW alignments or designs that could increase the costs of constructing new infrastructure. A 2012 WECC study, for example, provides information on transmission line construction costs per mile, which range from $927,000 to $2,967,000 depending on voltage and whether lines are single or double circuit lines. The same study provides cost multipliers for difficult terrains, reaching up to 2.25 in the case of forested lands (WECC 2012). Utilities and other infrastructure investors typically pass these costs on to consumers. Where the rate base is smaller, such as in rural areas, per-customer rate impacts associated with constructing a 10-mile, 230kV transmission line, for example, would be greater compared to the economic impacts on rate payers served by a larger metropolitan utility proposing the same line. Under Alternatives B, C, D, E, and the Proposed Plan, rate payers serviced by local utility providers with small rate bases would be impacted more by costs associated with added route lengths or infrastructure design requirements compared with rate payers serviced by larger, multi-state providers. Where technically and financially feasible, Alternatives B, D, and the Proposed Plan identify burial of power lines as a design option to mitigate impacts on GRSG. New construction costs of underground transmission lines can be between 4 and 14 times higher compared to new overhead construction (PSC 2011), depending on terrain. In rural areas, burial of new distribution lines would be more than double the cost of new overhead construction. Burying existing distribution lines would likely cost between $400,000 and $500,000 per mile in rural areas (EIA 2012). Under all alternatives, where burying new lines would be technically unfeasible or result in costs that could not be absorbed by the rate payers, infrastructure investors would explore other route or design options that avoid impacts to GRSG habitat."

Special Status Species (Greater Sage-Grouse)

- Objective SSS 6 was modified to clarify that the BLM will coordinate with the State of Oregon regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring related to adaptive management and anthropogenic disturbances. This modification was recommended by the Governor during the Governor's Consistency Review.

Leasable Mineral Resources

- Based on internal review, MLS 7 from the proposed RMPA, which is now MD MR 7 in the ARMPA, was modified to include all fluid mineral lease development, including geothermal permits to drill.

2.4.4 Utah

General Changes

- Throughout the Proposed RMP Amendment, the use of words like “would,” “could,” “should,” and “may” were generally removed or revised to reflect the active management direction of an ARMPA rather than potential management presented when the Proposed RMP Amendment was one of many alternatives the agency could select.
- Language was added to Objective SSS-3 (Objective GRSG-3 in the Proposed RMP Amendment), MA-SSS-4 (MA-GRSG-4 in the Proposed RMP Amendment), MA-SSS-6 (MA-GRSG-6 in the Proposed RMP Amendment), Objective VEG-1, MA-VEG-1, MA-FIRE-3 and MA-FIRE-4 to clarify that landscapes that include populations of both GRSG and Utah prairie dog (UPD), a federally listed species, be managed for the benefit of both species. This addition is included to ensure that this objective is applied to all applicable objectives and management actions, not just the five actions in the Proposed RMP Amendment where this concept and language was already present.
- Throughout the Proposed RMPA there were a number of references to coordinating with the State of Utah, Division of Wildlife Resources, or state biologists. These were all revised to note that such coordination would be with “the appropriate State of Utah agency.” This clarification was made at the request of the Governor during the Governor’s Consistency Review.
- The Proposed RMP Amendment introduced the term “biologically significant units” (BSU) for adaptive management and the disturbance cap to provide a consistent approach for managing and monitoring across the GRSG range. In the Utah Sub-Region, the BSU concept is the same as PHMA within population areas. As part of resolving protests, the ARMP was revised to note that “BSUs” are PHMA within population areas. Whenever the term BSU was used, it was replaced with the more descriptive text, with a parenthetical reference to BSUs for the purposes of coordinating across state lines.

Special Status Species (formerly Greater Sage-Grouse)

- Objective GRSG-1 from the Proposed RMP Amendment, which is now Objective SSS-1 in the ARMPA, was changed to remove reference to WAFWA management zones when addressing designation of PHMA. This change was made during the Governor’s Consistency Review to more closely reflect the management in the State of Utah’s Conservation Plan for Greater Sage-Grouse in Utah (2013).
- MA-GRSG-1 from the Proposed RMP Amendment, which is now MA-SSS-1 in the ARMPA was revised to include the following text: “The BLM will apply these goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate.” This is consistent with the planning criteria contained in the sixth bullet on page 1-20 of the Final EIS. This language was added based on an accepted recommendation made by the Governor during the Governor’s Consistency Review.
- The language of MA-GRSG-1 from the Proposed RMP Amendment, which is now MA-SSS-1 in the ARMPA, regarding non-habitat areas within PHMA and GHMA was revised to clarify the intent of the action. This revision was made as a result of internal reviews to ensure the text more accurately reflected the intent behind the management action.

- The introductory language of MA-GRSG-3 from the Proposed RMP Amendment, which is now MA-SSS-3 in the ARMPA, was revised to clarify the intent of the action. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action and to focus on land uses that have been identified as threats to GRSG.
- The language of MA-GRSG-3e from the Proposed RMP Amendment, which is now MA-SSS-3e in the ARMPA, was revised to clarify the intent of the noise restrictions. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action to focus on land uses that have been identified as threats to GRSG. Further, language was added to identify when "ambient" noise levels would be assessed to avoid managing for continual, incremental increases in noise levels.
- The language of MA-GRSG-6 from the Proposed RMP Amendment, which is now MA-SSS-6 in the ARMPA, was revised to clarify the intent of GRSG management outside PHMA/GHMA. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action. The purpose of this action is to provide direction regarding management of areas outside PHMA/GHMA that have been treated to improve GRSG habitat. The change was necessary to avoid implication of changing allocations or altering PHMA/GHMA boundaries outside a planning process while minimizing conflicting land uses in areas where an investment in increasing GRSG habitat have been made.

Livestock Grazing

- The language of MA-GRA-6 from the Proposed RMP Amendment, which is now MA-LG-6 in the ARMPA, was revised. The concepts and intent did not change, but the text was revised to align with similar concepts and intent that was present in the livestock grazing sections in GRSG amendments throughout the Great Basin.

2.5 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed RMP/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four Great Basin Region PRMPAs/FEISs.

The Director concluded that the BLM followed all applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party has been notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.4.1. The BLM Director's decisions on the protests are summarized in each of the PRMPAs/FEISs Director's Protest Resolution Reports, which are available on the following

BLM website:
http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

2.5.1 Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed LUPA/Final EIS, the BLM Director received 20 timely protest submissions. All of the protesting parties had standing; however, one submission was dismissed as it did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- adaptive management,
- GRSG habitat objectives,
- livestock grazing,
- mitigation,
- compliance with APA,
- compliance with the Energy Policy Act of 2005,
- ACECs,
- fire and fuels management,
- fluid minerals,
- solid minerals,
- special status species,
- lands and realty, and
- travel and transportation management.

2.5.2 Nevada and Northeastern California

For the Nevada and Northeastern California GRSG Proposed LUPA/Final EIS, the BLM Director received 40 timely protest submissions. All of the protesting parties had standing; however, two submissions were dismissed as they did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- adaptive management,
- GRSG habitat objectives,
- livestock grazing,
- mitigation,
- compliance with APA,

- compliance with the Energy Policy Act of 2005,
- Air Quality,
- Climate Change,
- Noise,
- ACECs,
- solid minerals,
- special status species,
- lands with wilderness characteristics,
- lands and realty,
- tribal issues,
- wild horse and burros, and
- travel and transportation management.

2.5.3 Oregon

For the Oregon GRSG Proposed LUPA/Final EIS, the BLM Director received 30 timely protest submissions. All of the protesting parties had standing; however, three submissions were dismissed as they did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- monitoring,
- ACECs,
- fire and fuels management,
- solid minerals,
- special status species, and
- travel and transportation management.

2.5.4 Utah

For the Utah GRSG Proposed LUPA/Final EIS, the BLM Director received 43 timely protest submissions. All of the protesting parties had standing; however, three submissions were dismissed as they did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- adaptive management,
- land use allocations,

- GRSG habitat objectives,
- livestock grazing,
- mitigation,
- compliance with APA,
- compliance with the Energy Policy Act of 2005,
- air quality,
- climate change,
- noise,
- ACECs,
- fire and fuels management,
- fluid minerals,
- solid minerals,
- special status species,
- lands and realty,
- travel and transportation management, and
- reasonable foreseeable development scenarios.

2.6 Governor's Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and resource management plans also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement throughout the development of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal laws and regulations applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

The 60-day Governor's consistency review period ended on July 29, 2015. In the Great Basin Region, the Governors of Idaho, Nevada, Oregon, and Utah submitted letters to their respective BLM State Directors identifying inconsistencies between the BLM's proposed RMP amendments and their state's or local governments' resource-related plans, policies and/or procedures, as well as other concerns that they had with the proposed planning documents. The BLM State Directors notified the Governors as to whether their recommendations were accepted or rejected on August 6, 2015. These Governors were then provided with 30-days to appeal the BLM State Director's decisions to the BLM Director. By September 8, 2015, the BLM Director received appeals from.

In some instances, modifications to the ARMPAs were addressed based on recommendations submitted to the BLM by the applicable Governors. These modifications to the ARMPAs were made and are summarized in Section 2.4.1.

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs in order to meet in the purpose and need of this effort to identify and incorporate appropriate management direction in LUPs to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. All management considered under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law there are typically few or no distinctions between alternatives.

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the FWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix C, Required Design Features (RDFs), of each of the attached ARMPAs.

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, this alternative did not provide adequate conservation in GHMA. .

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below) and included two sub-alternatives under Alternative C for a reduction in livestock grazing and wild horses and burros management.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required to conserve GRSG and its habitats. Alternative C was also not selected in its entirety because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which was identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocations are less stringent, but still aim to protect GRSG habitat (for example, applying moderate constraints and stipulations to fluid minerals in GHMA).

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative based on information provided by the State or Governor's offices for inclusion and analysis in the EISs. In many instances, the BLM had to adjust what was provided by the States and Governors to fit BLM language, decision-making constructs, etc. This alternative incorporates guidance from specific state conservation strategies, if developed or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. This document describes the Oregon Department of Fish and Wildlife's proposed management of GRSG on Federal lands. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. In alternative E1 conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected in its entirety as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the alternative were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA. While the Utah Draft EIS did not include an Alternative F, it did create two sub-alternatives under Alternative C for livestock grazing and wild horses and burros to consider and analyze a similar reduction.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture.

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focused on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ’s 40 most-asked questions regarding CEQ’s NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative B, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- FWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- FWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

Utah

- FWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department of the Interior policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed management.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date. For more plan specific information related to the public involvement, consultation, and coordination processes that the BLM conducted, please refer to Chapter 3 of the attached ARMPAs.

4.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Draft RMPAs/DEIS, Idaho and Southwestern Montana conducted seven public meetings, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMPAs/Draft EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plan Amendments. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft RMPAs/Draft EISs' comment periods. Comments on the Draft RMPAs/Draft EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMPAs.

A Notice of Availability (NOA) for all of the Great Basin Region GRSG Proposed RMPAs and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governor'' consistency review. Refer to **Section 2.5 and 2.6** for a full description of the protest period and governor's consistency review outcomes.

4.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support

- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the FWS and the U.S. Forest Service. In addition, the Great Basin sub-regions also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 13 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs. These cooperating agencies divided by sub-region are provided below:

Great Basin Region-Wide
US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana
Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California
Churchill County

Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon
Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah
Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County

Emery County
Garfield County
Grand County
Iron County
Kane County
Lincoln County (WY)
Millard County
Rich County
Sanete County
Sevier County
State of Utah (PLPCO)
State of Wyoming
Sweetwater County (WY)
Sweetwater County Conservation District (WY)
Tooele County
Uinta County (WY)
Uintah County (UT)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

4.3 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the FWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the FWS for review. The USFWS evaluated the biological assessments and concurred with the either a "no affect" or "may effect, but will not adversely affect" determination via memorandum for

Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the Utah Prairie Dog, a threatened species under the ESA. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix K).

4.4 Native American and State Historic Preservation Office Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent 65 letters to tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

As part of the NEPA scoping and consultation process, and as an opportunity to provide comment pursuant to Section 106 of the NHPA, the BLM notified and/or invited the Idaho, Montana, Nevada, California, and Oregon State Historic Preservation Officers (SHPOs) seeking information regarding concerns with historic properties and land use planning direction included in these ARMPAs, to participate in the planning process. The BLM sought information about historic properties in consideration of land use planning decisions included in these ARMPAs in accordance with the National Programmatic Agreement (PA) between the BLM, Advisory Council on Historic Preservation, and National Conference of State Historic Preservation Officers and the Idaho, Montana, and Oregon State Protocol Agreement between the BLM and these SHPOs. The BLM incorporated the information it received from SHPOs and Tribes into the Proposed RMPAs and considered such information in making the land use plan amendment decisions. The BLM has met its obligations under Section 106 of the NHPA, 54 U.S.C. § 306108, as outlined in the National PA and the State Protocols.

For the Utah ARMPA, the BLM completed consultation with the Utah SHPO in accordance with the 36 CFR Part 800. In July 2015, the BLM submitted a formal letter, concluding that the land use plan amendments would not adversely affect cultural properties and seeking input and concurrence on those findings and received a concurrence letter from the Utah SHPO on July 30, 2015. The BLM will satisfy the requirements of NHPA Section 106 for future implementation-level decisions, such as project proposals, including adequate consultation with SHPOs, Tribal Historic Preservation Officers (THPOs), Native American Tribes, and other interested parties, consistent with the alternative procedures set forth in the National PA and relevant State Protocol or where applicable the Section 106 regulations.

5. REFERENCES

6. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. Notices of the public availability of the Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published in the Federal Register on May 29, 2015. in the (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of the Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Date
Director
Bureau of Land Management

Secretarial Approval

I hereby approve the land use plan amendment decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Janice Schneider Date
Assistant Secretary for Land and Minerals
Management
Department of the Interior

7. ATTACHMENTS

Attachement 1. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Attachement 2. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Attachement 3. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Attachement 4. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

PL_PUB_3714
9.1

Style Definition: Comment Text

Style Definition: Comment Reference

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region including the Greater Sage-Grouse Sub-Regions of:

Idaho and Southwestern Montana
Nevada and Northeastern California
Oregon
Utah

Prepared by:

U.S. Department of the Interior
Bureau of Land Management
Washington, DC

September 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

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In Reply Refer To:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). The ROD approves the four Great Basin Region ARMPAs, which are part the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011. The conservation strategy was initiated by the Bureau of Land Management (BLM) in response to the U.S. Fish and Wildlife Service's (FWS) March 2010 "warranted, but precluded" Endangered Species Act (ESA) listing petition decision. In this decision, the FWS identified the inadequacy of regulatory mechanisms as a significant threat to GRSG. RMP conservation measures were identified as the BLM's principal regulatory mechanism.

The BLM's ARMPAs provide a landscape-level, science-based, coordinated, collaborative strategy for addressing threats to the Greater Sage-Grouse (GRSG) and its habitat. This strategy was designed to address issues identified in the FWS 2010 "warranted but precluded" decision. In addition, the strategy was guided by over a decade of research, analyses and recommendations for GRSG conservation including the Conservation Objectives Team (COT) Report and the BLM National Technical Team (NTT) Report. Each of these reports was developed through a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and other partners were fundamental to the development of these ARMPAs.

It is important to note that this ROD and these ARMPAs apply only to BLM-administered lands, including BLM sub-surface mineral estate. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. These Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs for the Great Basin sub-regions included proposed GRSG management direction for National Forest System lands (in Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah). However, the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy and Management Act (FLPMA) require the development and maintenance, and, as appropriate, the revision of land use plans for management of public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions significantly affecting the quality of the human environment. In fulfillment of these requirements, the Draft RMP Amendments/Draft EISs incorporated analysis and input provided by the public; local, State, and other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM resource specialists, and were published in the fall of 2013. Ninety -day public comment periods ensued, with more than 4,990 substantive comments from 1,348 unique letters submitted on all four sub-regional proposed LUPAs/Final EISs in the Great Basin Region. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

The Proposed RMPAs/Final EISs were made available on May 29, 2015, for a 60-day governor's consistency review and 30-day protest period. The BLM received consistency review letters from the States of California, Idaho, Montana, Nevada, Oregon, and Utah in the Great Basin Region and has worked closely with these states to address their concerns and to resolve inconsistencies where possible. Across all four sub-regions in the Great Basin Region, 133 protest submission letters were received from government entities, private citizens, NGOs, and other stakeholders; 124 of these submissions contained valid protest issues pursuant to 43 CFR 1610.5-2 and were addressed in the Director's Protest Resolution Reports. These reports are available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

The BLM now approves the attached ARMPAs as the land use plans that will guide future land and resource management within GRSG habitat in the Great Basin Region for the life of the plan amendments. The ARMPAs will benefit GRSG and over 350 other species of wildlife as well as other multiple uses, including grazing and recreation, which depend on healthy sagebrush-steppe landscapes.

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Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the public, local, state, and other federal agencies, Native American tribal representatives, and the Cooperating Agencies, all of whom contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This Record of Decision (ROD) is the culmination of an unprecedented effort to conserve Greater Sage-Grouse habitat on public lands administered by the Bureau of Land Management (BLM), consistent with the BLM's multiple use and sustained-yield mission and the joint objective established by federal and state leadership through the Greater Sage Grouse Task Force to conserve GRSG habitat on federal, state, and private land such that additional protections under the Endangered Species Act (ESA) can be avoided.

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In response to a 2010 determination by the FWS that the listing of the GRSG under the ESA was "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service), has developed a targeted, multi-tiered, coordinated, collaborative landscape-level management strategy, based on the best available science, that offers the highest level of protection for GRSG in the most important habitat areas to address the specific threats identified in the 2010 FWS "warranted but precluded" decision and the FWS 2013 Conservation Objectives Team (COT) report.

This ROD and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah include management direction that avoids and minimizes additional disturbance in GRSG habitat management areas as well as targets restoration and improvements to the most important areas of habitat. The management direction in the ARMPAs is accomplished through land use allocations that ~~generally~~ apply to GRSG habitat. These allocations (1) eliminate most new surface disturbance in the most highly-valued sagebrush ecosystem areas identified as Sagebrush Focal Areas (SFAs); (2) avoid or limit new surface disturbance in Priority Habitat Management Areas (PHMAs), of which SFAs are a subset; and (3) minimize surface disturbance in General Habitat Management Areas (GHMA). In addition to protective land use allocations in habitat management areas, the ARMPAs include a suite of management actions, such as the establishment of disturbance limits, GRSG habitat objectives, mitigation requirements, monitoring protocols, and adaptive management triggers and responses, and other conservation measures that apply throughout designated habitat management areas. The cumulative effect of these measures is to conserve, enhance, and restore GRSG habitat across the remaining range of the species in the Great Basin and provide greater certainty that BLM land use plan decisions in GRSG habitat in the Great Basin Region can lead to conservation of the GRSG and other sagebrush-steppe associated species in the region.

The targeted land use plan protections presented in this ROD and ARMPAs not only protect the GRSG and its habitat, but also over 350 wildlife species associated with the sagebrush-steppe ecosystem, which is widely recognized as one of the most endangered ecosystems in North America. Reversing the slow degradation of this valuable ecosystem will also benefit local rural economies and a variety of rangeland uses in addition to habitat protection, including recreation and grazing, in a manner that safeguards the long term sustainability, diversity and productivity of these important and iconic landscapes.

This conservation strategy has been developed in conjunction with the 10 states in which the ARMPAs in the Great Basin and the plans in the Rocky Mountain Region apply. In combination with additional state and federal actions underway and in development, the strategy represents an unprecedented, coordinated, and collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna in order to achieve the COT Report objective of "conserv[ing] the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT Report. 2013].

Table of Contents

Dear Reader Letter

Summary

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1. INTRODUCTION

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This Record of Decision (ROD) approves the BLM's attached approved resource management plan amendments (ARMPAs) for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPAs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM-administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.), BLM planning regulations (43 Code of Federal Regulations [CFR] §1601 et seq.), and other applicable laws. The BLM prepared Environmental Impact Statements (EISs) in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA) and the Council on Environmental Quality's Regulations for implementing the procedural provisions of NEPA (40 CFR §1500.1 et seq.).

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Throughout the GRSG planning process, the Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities for the Great Basin Region, which is available at ~~http://www.fs.usda.gov/r4/~~ http://www.fs.usda.gov/r4/.

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This ROD, in conjunction with the ARMPs and ARMPAs approved through the Rocky Mountain ROD, constitute land use planning decisions of the BLM to conserve the GRSG and its habitats throughout that portion of the remaining range of the species that is administered by the BLM under authority of FLPMA. The efforts of the BLM, in coordination with the U.S. Forest Service on National Forest System lands within the remaining range of the species, constitutes a coordinated strategy for conserving the GRSG and the sagebrush-steppe ecosystem on the majority of Federal lands on which the species depends. These decisions complement those implemented by federal agencies through ~~the~~ An Integrated Rangeland Fire Strategy: Final Report to the Secretary of the Interior and the Sage Grouse Initiative as well as those implemented by state and local governments as well as private land owners and other partners.

1.1 Great Basin Region Planning Area

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The Great Basin Region planning area is composed of four sub-regions: the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. (see **Figure 1-1** – Great Basin Region Greater Sage-Grouse Sub-regions). A separate EIS was prepared for each of these sub-regions. Each sub-region conducted its own planning effort with input from local cooperators, stakeholders, and members of the public. The sub-regional boundaries were constructed to align with BLM administrative offices, state boundaries, as well as areas that shared common threats to the GRSG and their habitat. The boundaries for these sub-regions largely coincide with zones III, IV, and V identified by the Western Association of Fish and Wildlife Agencies (WAFWA) Greater Sage-Grouse Conservation Strategy to delineate management zones with similar ecological and biological issues.

[Insert **Figure 1-1** - Great Basin Region Greater Sage-Grouse Sub-regions]

The Great Basin Region planning area boundaries include all lands regardless of jurisdiction (see **Figure 1-2** - Great Basin Region Planning Area). **Table 1-1** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and privately--owned lands within the four sub-regions that make up the Great Basin. The planning area also includes other BLM-administered lands that are not identified as habitat management areas for GRSG. The ARMPAs generally do not establish any additional management for these lands outside of GRSG habitat management areas and they will continue to be managed according to the existing land use plans for these planning areas.

[Insert **Figure 1-2** - Great Basin Region Planning Area]

Table 1-1
Land Management in the Great Basin Planning Area

Surface Land Management	NV/NE CA	ID/SW MT	Utah	Oregon	Great Basin Total
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,597,500**
USFWS	805,900	81,400	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,300**	**48,209,900**	**31,656,200**	**194,208,900**

Source: BLM GIS 2015
Acres have been rounded to the nearest hundredth.

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure 1-3** - Great Basin Region Decision Area , Greater Sage-Grouse Habitat Management Areas (BLM-administered)), including surface and split-estate lands where the BLM has subsurface mineral rights. For a description of these habitat management areas, refer to **Section 1-5**.

[Insert Figure 1-3 - Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas (BLM-administered)]

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1.2 Early GRSG Conservation Efforts

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Currently, GRSG occupy an estimated 66% of the historically occupied range. The BLM manages the majority of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State populations). Efforts to conserve GRSG habitat by the BLM and other wildlife conservation agencies and organizations have been ongoing for many years. These efforts provide an important foundation for the GRSG conservation strategy that guides these plans.

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The WAFWA 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, which includes contributions from the BLM, was to present an unbiased and scientific assessment of dominant issues and their effects on GRSG populations and sagebrush habitats.

http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the FWS, the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG. http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation and summarize the BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States.

http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, the BLM commissioned an effort to map and model breeding densities of GRSG across the West. A conference was convened with state wildlife agencies to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active leks across the West. This model served as a standard starting point for all states to identify priority habitat for the species.

http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published its 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910 (March 23, 2010)). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" under the Endangered Species Act (ESA). This finding indicates that, although the species meets the criteria for listing, immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

As part of their 2010 finding, the USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910 (March 23, 2010)). In addition, the FWS found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM, which manages approximately 66 million acres of the remaining habitat for the species (See **Figure 1-4**.), the USFWS has identified the agency's Resource Management Plans (RMPs) as the primary regulatory mechanisms.

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1.3 Threats to Greater Sage-Grouse in the Great Basin Region

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The FWS identified a number of specific threats to GRSG in the Great Basin Region in the context of its 2010 finding. The primary threats identified are the widespread present and potential impacts of wildfire, the loss of native habitat to invasive species, and conifer encroachment. Other threats, some of which are more localized by nature, include habitat fragmentation due to anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization and sagebrush elimination, as well as impacts to habitat associated with free-roaming equids and improper livestock grazing.

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In 2011, the BLM established the GRSG National Technical Team (NTT), comprised of BLM, USGS, NRCS, and State ~~Agency~~ specialists. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable GRSG populations focused on the threats identified in the FWS listing determination (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones (Figure 1-4). The NTT produced *A Report on National Greater Sage-grouse Conservation Measures* (The NTT Report) which proposed conservation measures based on habitat requirements and other life history requirements for GRSG. The NTT Report described the scientific basis for the conservation measures proposed within each program area. The NTT Report also emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. ~~To view the NTT Report, go to: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf~~

http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

In 2012, the USFWS, with the support of the Western Governors Association Sage Grouse Task Force, convened the Conservation Objectives Team (COT), comprising state and federal representatives, to produce a peer-reviewed report identifying the principal threats to GRSG survival and the degree to which these threats need to be reduced or ameliorated to conserve the GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The COT Report, released in March 2013, also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". Finally, the COT report identified present and widespread, as well as localized threats by GRSG population across the West (**Table 1-2)**. The BLM also identified and explained additional threats in the Final EISs that were published with proposed plans on May 29, 2015. **Figure 1-4** identifies the PACs, GRSG populations (and their names), and WAFWA Management Zones across the West. ~~To view the COT Report, go to:~~ http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

[Insert **Figure 1-4** - GRSG Priority Areas for Conservation, Populations, and WAFWA Management Zones.]

A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as highlighted in the 2013 COT report – is provided in **Table 1-2**.

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Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Improper Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan**
Rich-Morgan-Summit (UT)	9b				Y	Y	Y	Y		Y			Y	Y	UT
Uintah (UT)	9c				Y	Y	Y	L	Y	Y			Y	Y	UT
Strawberry Valley (UT)	10a	Y			Y	Y	Y	Y		Y			Y		UT
Carbon (UT)	10b	Y			Y		Y	Y	Y	Y			Y		UT
Sheeprock Mountains (UT)	11	Y			Y	L	L	Y	Y	L		Y	L		UT
Emery (UT)	12	Y			Y	Y	Y	Y	Y	Y			Y		UT
Greater Parker Mountain (UT)	13a				Y	Y	Y			Y			Y		UT
Panguitch (UT)	13b			Y	Y	Y	Y	Y	L	Y			Y	L	UT
Bald Hills (UT)	13c	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	UT
Ibapah (UT)	15a	Y			Y	Y	Y	Y	Y	Y		Y	Y		UT
Hamlin Valley (UT)	15b	Y			Y	Y	Y			Y		Y	Y		UT
Box Elder (UT)	26b			Y	Y	Y	Y	L	Y	Y			Y		UT

Table 1-2. Threats to GRSG in the Great Basin Region (Utah) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

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Population	Unit Number	Isolated Small Size	Sagebrush Elimination	Conversion	Fire	Conifers	Weeds/Annual Grasses	Energy	Mining	Infrastructure	Improper Grazing	Free-Roaming Equids	Recreation	Urbanization	EIS/Plan(s)
N. Great Basin (OR, ID, NV)	26a		L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	ID/SW MT, OR, NV/CA
Baker (OR)	17	Y	Y	Y	Y	L	Y	L	Y	L	U		L	L	OR
Central Oregon (OR)	28		L	L	Y	Y	Y	L	Y	L	Y	U	L	L	OR
W. Great Basin (OR, CA, NV)	31		L	L	Y	Y	Y	L	L	L	Y	Y	U		OR, NV/CA
Klamath (CA)	29	Y	U	U	Y	Y	Y	L		U	U	U	U	U	NV/CA
Northwest Interior (NV)	14	Y			Y		Y	U	Y	Y	Y	Y	Y		NV/CA
Southern Great Basin (NV)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y		NV/CA
Quinn Canyon Range (NV)	16	Y			Y	Y	Y			Y	Y	Y	Y		NV/CA
Warm Springs Valley (NV)	30	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	NV/CA
East Central (ID)	18	Y	L	Y	L	Y	L	Y		Y	Y		L		ID/SW MT
Snake-Salmon-Beaverhead (ID)	23		L	L	Y	L	Y	Y		L	Y	Y	L		ID/SW MT
Weiser (ID)	25	Y	L	L	L	L	Y	Y		L	Y		L	L	ID/SW MT
Sawtooth (ID)	27	Y	L		L	U	L			Y	Y		L		ID/SW MT
Southwest Montana (MT)	19-22		L		L	L	Y	L	L	L	Y		L	L	ID/SW MT

Table 1-2. (cont.) Threats to GRSG in the Great Basin Region (OR, CA, NV, ID, SWMT) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

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1.4 National Greater Sage Grouse Conservation Strategy

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Based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a listing decision on this species, the BLM recognized the need to incorporate explicit objectives and concrete conservation measures into Resource Management Plans (RMPs) to conserve GRSG habitat and provide robust regulatory mechanisms. In August, 2011, the BLM chartered a strategy to revise and amend existing RMPs throughout the range of the GRSG to incorporate management actions intended to conserve, enhance, and restore the species and the habitat on which it depends. Separate planning efforts were initiated to address the conservation needs of the Bi-State population in California and Nevada, and the Washington State distinct population segment.

In light of the 2010 “warranted” determination by the FWS, and specific threats summarized in the COT Report, the BLM found that additional management direction and specific conservation measures on federal public lands would be necessary to address the present and anticipated threats to GRSG habitat and to restore habitat where possible. The BLM proposed to incorporate the management direction and conservation measures into the BLM’s land use plans. The goal of incorporating these specific measures into BLM land use plans is to conserve, enhance, and restore GRSG and its habitat and to provide sufficient regulatory certainty such that the need for listing the species under the ESA may be avoided.

In December 2011, the BLM published a Notice of Intent to prepare EISs and Supplemental EIS to incorporate GRSG Conservation Measures into Land Use Plans (LUPs) across the range of the species. A total of 15 sub-regional planning efforts and associated EISs were intiated to analyze the alternatives developed for each of the plan amendments and revisions across the range of the species. [1] **Figure 1-5** illustrates the regional and sub-regional planning area boundaries, along with BLM-administered PHMAs and GHMAs across the Western United States.

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[Insert **Figure 1-5** – Regional and Sub-Regional Boundaries with GRSG Habitat Management Areas (BLM-Administered Lands)]

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The planning efforts associated with the National GRSG Conservation Strategy have been coordinated under two administrative planning regions: the Rocky Mountain Region and the Great Basin Region. The regions were drawn roughly to correspond with the threats identified by USFWS in the 2010 listing decision, along with the WAFWA Management Zones (MZs) framework (Stiver et al. 2006). Due to differences in the ecological characteristics of sagebrush across the range of the greater sage-grouse, WAFWA delineated seven Management Zones (MZs I-VII) based primarily on floristic provinces.

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[1] The National GRSG Conservation Strategy consisted of 15 separate EISs. The Bighorn Basin RMP has been split between the two field offices that make up the Bighorn Basin planning area, the Cody Field Office ARMP and the Worland Field Office ARMP. The Billings and Pompeys Pillar National Monument RMP has also been split between the Billings Field Office ARMP and Pompeys Pillar National Monument ARMP. This results in a total of 17 ARMPs and ARMPAs.

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Vegetation found within a MZ is similar and sage-grouse and their habitats within these areas are likely to respond similarly to environmental factors and management actions.

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The Rocky Mountain Region is comprised of BLM planning efforts (which includes plan revisions and plan amendments) in the states of Montana, North Dakota, South Dakota, Wyoming, Colorado, and portions of Utah. This region falls within WAFWA MZs I (Great Plains), II (Wyoming Basin) and a portion of VII (Colorado Plateau). The Great Basin Region is comprised of planning efforts (plan amendments) in California, Nevada, Oregon, Idaho, and portions of Utah and Montana. This region falls within WAFWA MZs III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin).

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Both the Rocky Mountain and Great Basin regions are further divided into sub-regions. The NEPA EIS analyses were done at the sub-regional level. These sub-regions are based on the identified threats to the GRSG and the WAFWA MZs from the FWS 2010 listing decision with additional detail regarding threats to individual populations and sub-regions from the FWS COT report. In the Rocky Mountain Region, some sub-regions correspond to BLM field/district office boundaries, specifically for planning efforts that are incorporating GRSG conservation measures through plan revisions that were initiated prior to the start of the National GRSG Conservation Strategy in December 2011.

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The BLM used the best available science, including additional review from the USGS on specific issues that arose in developing the ARMPAs. Additionally, the BLM considered state GRSG conservation strategies where they existed, as well as state recommendations for measures to conserve GRSG on BLM-administered lands, where relevant, in the planning effort. These are reflected in the approved plans to the extent compatible with GRSG conservation objectives to conserve, enhance and restore GRSG habitat to address the threats identified in the FWS 2010 listing determination and the 2013 COT Report.

1.5 How the Approved Resource Management Plan Amendments Address the Identified Threats to the Conservation of the GRSG

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The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to “maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations”. The NTT Report also endorsed this goal “as a guiding philosophy against which management actions and policies of BLM should be weighed”.

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In establishing the COT, with the backing of the Sage Grouse Task Force, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006 WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following:

> “The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population

> trends will eventually be stable or increasing, even if numbers are not restored to historic levels. (WAFWA 2006 Strategy)"

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized an "avoidance first strategy" and stressed those threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

The plans were developed to address specific, identified threats to the species in order to conserve GRSG such that the need to list the species under ESA may be avoided. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain land use plan direction on approximately 66 million acres of the remaining habitat for the species (See **Figure 1-5**.). These plans are the product of extensive coordination between the BLM and the Forest Service and the active engagement of the FWS which informed the BLM and Forest Service land allocation and related management decisions. The plans also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, priorities and approaches in each.

In order to protect the most important GRSG habitat areas, the planning effort began with mapping areas of important habitat across the range of the GRSG. In collaboration with state fish and wildlife agencies, the BLM identified areas as preliminary priority habitat (PPH) and preliminary general habitat (PGH). In Utah, all occupied GRSG habitat was identified as PPH. The draft land use plans used PPH and PGH to analyze the impacts of the decisions the BLM was proposing in the plans. PPH and PGH were identified as Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) in the Proposed RMP Amendments/Final EISs to identify the management decisions which apply to those areas (except for Nevada and Utah). The designated GRSG Habitat Management Areas on BLM-administered lands in the decision area include: PHMA, which largely coincide with Priority Areas for Conservation (PACs) identified in the COT Report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report) (See **Figure 1-4**); GHMA; Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California); and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table 1-4** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

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Habitat maps were based initially on state key habitat maps which identified areas necessary for sage-grouse conservation derived from various data sources including breeding bird density maps and lek counts, nesting areas, sightings, and habitat distribution data including occupied suitable seasonal habitats, nesting and brood rearing areas, and connectivity areas or corridors. This information served as the basis for the development of BLM preliminary priority habitat (PPH) and preliminary general habitat (PGH) maps and, subsequently, for the identification of Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas~~,~~ (GHMA), respectively. The COT also used state key habitat maps as a basis for identifying Priority Areas for Conservation (PACs). The COT report notes that there is substantial overlap between PACs and BLM PPH areas, with the exception of areas in Nevada and Utah [COT Report, p 13].

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PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having highest habitat value for maintaining sustainable GRSG populations. The boundaries and management strategies for PHMAs are derived from and generally follow the Preliminary Priority Habitat boundaries. Areas of PHMAs largely coincide with areas identified as Priority Areas for Conservation (PACs) in the COT report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report).
- **GHMA**— BLM-administered lands that are occupied seasonal or year-round habitat outside of PHMA where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMAs are derived from and generally follow the Preliminary General Habitat boundaries.
- **OHMA** —BLM-administered lands in Nevada, identified as unmapped habitat in the Proposed RMP/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.
- **IHMA** —BLM-administered lands in Idaho that provide a management buffer for PHMAs and connect patches of PHMAs. IHMAs encompasses areas of generally moderate to high habitat value habitat and/or populations, but that are not as important as PHMAs. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

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Table 1-3

Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

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BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah*	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

*41,200 acres of National Forest System lands in the Anthro Mountain area of Utah would be managed as neither PHMA nor GHMA. These areas would be identified as "Occupied – Anthro Mountain." In the Utah ARMPA, these areas are considered split-estate, where the BLM administers the mineral estate.

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The ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs (see **Figure 1-3** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). Across the Great Basin Region, there are 8,385,280 acres of BLM administered SFAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" and which represent "a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection”. (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf).

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SFAs are areas of highest habitat value for GRSG and are managed to avoid new surface disturbance~~, to the extent permitted by law~~, given that they contain high-quality sagebrush habitat; highest breeding densities; have been identified as essential to conservation and persistence of the species; represent a preponderance of current federal ownership and, in some cases, are adjacent to protected areas that serve to anchor the conservation importance of the landscape. SFA management is consistent with the recommendations provided by FWS that these are the areas “where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species.”

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This tiered habitat management area framework, in associated with the land use plan allocation decisions (explained more fully in Section 1.6.2 of this ROD) in the ARMPs and ARMPAs provide a high degree of certainty that the integrity of PHMAs can be maintained through management decisions to avoid or minimize additional surface disturbance.

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Remaining habitats in GHMAs and IHMAs (applicable only to BLM-administered lands in Idaho) would be managed consistent with the COT Report recommendation to recognize “that important habitats outside of PACs be conserved to the extent possible”. Thus, land allocations in GHMAs and IHMAs provide for more flexibility for land use activities while minimizing impacts on existing GRSG leks.

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Major components of the attached ARMPAs that address the specific threats to GRSG and its habitat, as identified in the USFWS 2010 listing decision and 2013 COT Report (many of which were also identified by the BLM’s 2011 NTT Report) are listed and summarized in **Table 1-4**.

Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner.
All development	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in

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Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
threats, including mining, infrastructure, and energy development.	PHMA (slight variations to this management component in the State of Nevada only) ● PHMA and IHMA: Apply a disturbance density cap of 1 energy and mining facility per 640 acres (except in the State of Nevada) ● IHMA: Implement the 3% disturbance cap. Apply Anthropogenic Disturbance Development Criteria. ● Apply buffers based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. ● Apply Required Design Features (RDFs) when authorizing actions in GRSG habitat. ● Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. ● Consider the potential for the development of valid existing rights when authorizing new projects in PHMA. ● When authorizing third-party actions that result in habitat loss and degradation, require and ensure mitigation that provides a net conservation gain to the species.
Energy development—fluid minerals, including geothermal resources	● PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. In Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for authorization if certain criteria are met. ● IHMA: Open to fluid mineral leasing subject to NSO stipulation without waiver or modification, and with limited exception. ● GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations) ● Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
Energy development—wind energy	● PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) ● IHMA: Avoidance area (may be available for wind energy development with special stipulations)

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Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	**Key Management Responses from the Great Basin Region GRSG ARMPAs**
	• GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas are open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • IHMA: Avoidance area (may be available for solar energy development with special stipulations) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas are open to solar energy development)
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • IHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations) • IHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals, however, expansion of existing operations could be considered if the disturbance is within the cap and subject to compensatory mitigation.
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Improper Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and

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Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
	ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. ● Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	● Prioritize gathers in SFAs, followed by other PHMAs. ● Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. ● Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	● Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. ● Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas.
Recreation	● PHMA and IHMA: Do not construct new recreation facilities unless required for health and safety purposes or if the construction will result in a net conservation gain to the species. ● Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. ● PHMA & GHMA: OHV use limited to existing routes (routes to be designated through future travel management planning). The Utah ARMPA does retain two areas as open to OHV use in PHMA.
Fire	● Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. ● Restrict the use of prescribed fire for fuel treatments. ● Prioritize post-fire treatments in SFAs, other PHMAs, IHMAs, and GHMAs.
Nonnative, invasive plant species	● Improve GRSG habitat by treating annual grasses. ● Treat sites in PHMA, IHMA, and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	● PHMA: Maintain all lands capable of producing sagebrush (but no less than 70%) with a minimum of 15 percent sagebrush canopy cover, ~~or as~~

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Table 1-4
Key Responses from the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses from the Great Basin Region GRSG ARMPAs
	consistent with specific ecological site conditions. ● All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	● Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	● GRSG habitat will be retained in federal management unless: (1) the agency can demonstrate that disposal (including exchanges) of the lands will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal (including exchanges) of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse.

1.6 Key Components of the BLM Greater Sage-Grouse Conservation Strategy

The ARMPAs were developed to meet the purpose and need to conserve, enhance, and restore GRSG and their habitat by eliminating or minimizing threats to GRSG habitat identified in the 2010 listing decision and highlighted in the "background and purpose" section of the COT report. Consequently, consistent with guidance contained in the COT and NTT Reports, four essential components of the GRSG conservation strategy were identified: 1) avoiding or minimizing new and additional surface disturbances, 2) improving habitat conditions, 3) reducing threats of rangeland fire to GRSG and sagebrush habitat in the Great Basin, and 4) monitoring and evaluating the effectiveness of conservation measures and implementing adaptive management as needed.

The land allocations and management actions included in the ARMPAs incorporate these components and are summarized below.

1.6.1 Avoid and Minimize Surface Disturbance

Land Allocations and Habitat Protection/Surface Disturbance Measures

The four Great Basin ARMPAs build on the designated habitat management areas described in **Section 1.5** by applying management actions to these areas to avoid and minimize disturbance associated with proposed projects as described below and shown in **Table 1.4**. Land use plan allocations specify

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locations within the planning area that are available or unavailable for certain uses and also prioritize conservation and restoration management actions applied to habitat management areas.

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Through this ROD, the BLM adopts those portions of the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah EISs applicable to National Forest System lands, pursuant to the provisions of 40 CFR 1506.3(c). The EISs sufficiently disclose and analyze all environmental issues associated with mineral leasing and provides support to the BLM to authorize mineral leasing in USFS administered lands, should consent be provided by or consultation be required with the USFS prior to issuance of a lease, in compliance with applicable mineral leasing and NEPA regulations, and subject to further site-specific environmental analysis where applicable.

The COT ~~report~~Report notes that "loss and fragmentation of sagebrush habitats is a primary cause of the decline of sage-grouse populations". ~~(COT, p 9).~~ While surface disturbance associated with development in the Great Basin is not ~~yet~~ as significant a threat to GRSG and its habitat as rangeland fire and invasive species~~,~~, the BLM ARMPAs include land allocations and management actions that avoid and minimize surface disturbance in PHMA for identified threats (e.g., energy, mining, infrastructure, improper grazing, free-roaming equids, recreation and urbanization). These land allocations and management actions are necessary because the location and extent of habitat loss to fire is difficult to predict and much of the habitat due to low precipitation in the Great Basin is difficult to restore once lost. Further, even a small amount of development in the wrong place could have an outsized impact in these landscapes.

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The most restrictive allocations include requirements to avoid and minimize additional disturbance in SFAs, which are a subset of PHMA, where surface disturbance from fluid mineral development is avoided by NSO without waiver, modification, or exception. In addition, these areas will be recommended for withdrawal to address the risk of disturbance due to mining.

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In PHMAs outside of SFAs new fluid mineral leasing would be subject to NSO with no waivers or modifications. Exceptions would be granted only if the proposed action would not have direct, indirect, or cumulative effects on GRSG or its habitat; or, if the action is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. This is fully consistent with guidance in the NTT report which states, "Do not allow new surface occupancy on federal lands within priority habitats" (NTT, p. 23).

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Similarly, PHMA is closed to non-energy and salable mineral development (this does not apply to locatable minerals governed under the 1872 Mining Law). An exception may be granted for free-use permits and the expansion of existing active pits for salable minerals and expansion of existing non-energy leasable development under certain conditions. This exception is included because of the importance of these materials to local communities and their limited disturbance which will be offset by the mitigation requirements. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses the potential disturbance threat from coal development. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

All PHMAs will be managed as exclusion areas for commercial renewable energy development (solar and wind) with the exception of areas outside of SFAs in three counties in southeastern Oregon. The three counties in Oregon will be managed as avoidance areas. ~~In these counties, the BLM will encourage new renewable energy development in non-habitat areas first.~~ New rights-of-ways and development for transmission lines, pipelines, and related infrastructure would be avoided through restrictions on land use authorizations. In avoidance areas, exceptions would only be granted if it can be demonstrated that adverse impacts will be avoided or that residual impacts will be mitigated.

Comment [JRL4]: This was a part of the agreement that needs to be reflected in the plan and the ROD.

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High voltage transmission lines will be avoided in PHMA. However, the planning, siting, and environmental review of a limited number of priority transmission lines (Transwest Express and portions (that are co-located with Transwest Express) of Gateway South, Gateway West and Boardman to Hemingway), which have been underway for a several years and are deemed critical to expanding access to renewable sources of energy and to improving the reliability of the western grid, will proceed through NEPA analysis of these proposed lines under separate authorization processes. Conservation measures for GRSG are being analyzed as part of those NEPA processes, which should achieve a net conservation benefit for GRSG.

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While restrictions on future development in PHMA are intended to avoid or minimize additional surface disturbance, restrictions on development in GHMA are tailored to allow disturbance but with restrictions to ensure compatibility with GRSG habitat needs. In addition, mitigation to avoid, minimize, and compensate for unavoidable impacts will be required for proposed projects in GHMA. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation. (See **Table 1-3** for more details on GHMA management decisions.) Any disturbance is subject to mitigation, with the objective of first avoiding and minimizing potential impacts to GRSG or its habitat and then compensating for unavoidable impacts to GRSG or its habitat, to a net conservation gain standard for the species. This is consistent with guidance in the COT Report which states: "Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal, state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

In addition to allocations that limit disturbance in PHMA and GHMA, the ARMPAs prioritize oil and gas leasing and development outside of identified PHMAs, and GHMAs to further limit future surface disturbance and encourage new development in areas that would not conflict with GRSG. This objective is intended to guide development to lower conflict areas and as such, reduce the time and cost associated with oil and gas leasing development by avoiding sensitive areas, reducing the complexity of environmental review and analysis of potential impacts to sensitive species, and decreases the need for compensatory mitigation.

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Additionally, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat, or, unless required for health and safety purposes.

In PHMA and GHMA, travel is limited to existing routes until routes are designated through the implementation travel management planning process. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning processes.

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In general, all forms of new development in PHMAs and GHMAs would either be closed, excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat, ensuring that existing habitat would be protected and providing opportunities, through compensatory mitigation.

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While improper livestock grazing can be a threat to GRSG habitat, grazing is not considered a discrete surface disturbing activity for purposes of monitoring and calculating disturbance. The plans address grazing management for the conservation of GRSG and its habitat by incorporating terms and conditions into permits to achieve habitat objectives ~~into permits~~ and by prioritizing assessment and the review of grazing permits (see Section 1.6.2).

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Disturbance Caps, Density Caps, Lek Buffers, and Required Design Features

In addition to the management actions and allocations discussed above, the ARMPAs provide further assurance that anthropogenic disturbances in PHMAs will be limited through the use of disturbance caps, density caps, and lek buffers.

A 3% anthropogenic disturbance cap in PHMA has been established in accordance with the recommendations contained in the NTT Report, and peer-reviewed literature from the Great Basin (Knick 2013). Disturbance will be calculated at two scales: first at a Biologically Significant Unit (BSU) scale determined in coordination with the state and second, for the proposed project area. BSUs are geographic units of PHMA that contain relevant and important GRSG habitat. In Oregon for example, BSUs are synonymous with PACs. These BSUs are used solely for the calculation of anthropogenic disturbance cap and in some ARMPAs, the adaptive management habitat triggers.

If 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within PHMA in any given BSU, no further discrete anthropogenic disturbances (subject to valid existing rights) will be permitted on BLM-managed lands within PHMAs in that BSU until restoration of disturbed lands brings the BSU below the cap. If the 3% anthropogenic disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap.

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An exception to the 3% disturbance cap is provided in designated utility corridors for purposes of achieving a net conservation gain to the species. This exception is limited to projects which fulfill the use for which the corridors were designated (e.g., transmission lines and pipelines) within the designated width of a corridor. This exception will concentrate future ROW surface disturbance in areas of existing disturbance and avoid new development of infrastructure corridors in PHMAs consistent with guidance in the COT report. In addition, the Oregon and Nevada/Northeast California ARMPAs include variations to the disturbance cap: Oregon does not allow more than 1% new anthropogenic disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, permit exceedances of the 3% disturbance cap at the BSU and/or the project level can occur provided that the outcome results in a net conservation benefit to the species with the concurrence of the BLM, Nevada Department of Wildlife, and FWS in each exception.

In Southwest Montana (the BLM's Dillon Field Office), the BLM will limit disturbance to 3% until the State of Montana's Sage Grouse Plan's disturbance calculation methodology is instituted and is in effect at which time disturbance will be permitted up to a 5% cap. This is to recognize, as with the Wyoming Core Area Strategy, the importance of the all-lands-all-disturbances strategy that Montana plans to institute for sage-grouse conservation.

Appendix E of each of the attached ARMPAs includes additional information about the methodology for calculating anthropogenic disturbance at the BSU and project scales.

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The ARMPAs also incorporate a cap on the density of energy and mining facilities to encourage co-location of structures to reduce habitat fragmentation. The limit is an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT Report. If the disturbance density in the PHMA in a proposed project area is, on average, less than 1 facility per 640 acres, the project can proceed through the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density in the proposed project area is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or redesigned so facilities are co-located into an existing disturbed area, subject to applicable laws and regulations, such as the 1872 Mining Law and valid existing rights. The one facility per 640 density decision does not apply to Nevada, as described in **Section 1.7**.

In addition to any other relevant information determined to be appropriate, the BLM will further assess and address impacts from certain activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). Lek buffer distances will be applied at the project specific level as required conservation measures to address the impacts to leks as identified in the NEPA analysis. The lek buffer distances vary by type of disturbance (road, energy development, infrastructure, etc.) and justifiable departures may be appropriate as fully described in Appendix B of the ARMPAs. In both PHMA and GHMA, impacts should be avoided first by locating the action outside of the applicable lek buffer-distance(s) as defined in the ARMPAs. In PHMA, the BLM will ensure that any impacts within the buffer distance from a lek are fully addressed. In GHMA, the BLM will minimize and compensate for any unavoidable impacts to the extent possible. This approach to determining relevant lek buffer distances is consistent with the COT recommendation that "conservation plans should be based on the best available science and use local data on threats and ecological conditions."

Additionally, Required Design Features (RDFs) are required for certain activities in all GRSG habitat, including oil and gas development, infrastructure, and other surface disturbing activities and are fully described in Appendix C of the attached ARMPAs. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts to GRSG and its habitat from threats (such as those posed by standing water that can facilitate West Nile virus or tall structures that can serve as perches for predators). However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). In Nevada and Northeastern California, RDFs are also applied to their identified OHMAs.

1.6.2 Improving Habitat Condition

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In addition to prescribing land use allocations and managing resource uses in order to minimize and avoid further surface disturbance, the ARMPAs identify management actions to restore and improve GRSG habitat.

The ARMPAs contain an overall habitat management objective that "In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions." To move toward this goal, the ARMPAs specify GRSG habitat objectives to be incorporated into land management programs, including wild horse and burros, grazing, and habitat restoration. These habitat objectives were developed for each of the GRSG's life history stages within each ARMPA's sub-region. These objectives will be used to meet the applicable land health standard in GRSG habitats.

The ARMPAs also include specific decisions to improve habitat conditions and meet the habitat objectives through treatment of invasive annual grasses and the removal of encroaching conifers in SFA, PHMA, and GHMA, and restoration of degraded landscapes, including those impacted by fire events (See **Section 1.6.3**.)

The BLM recognizes that improper grazing is a threat to GRSG and its habitat. Because grazing is the most widespread use of the sagebrush steppe ecosystem, the ARMPAs address improper grazing. The COT Report recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the Great Basin ARMPAs include requirements for the incorporation of terms and conditions informed by GRSG habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritize the review and processing of authorizations and field checks of grazing permits, and take numerous actions to avoid and minimize the impacts of range management structures (**see Table 1-4**).

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The BLM will prioritize reviews and processing of grazing authorizations, as well as field checks of grazing permits in the habitat that is most important to GRSG populations: first in SFAs, then PHMAs, followed by GHMA, focusing first on riparian and wet meadows. The decision to prioritize in this way does not indicate that grazing is more of a threat or is an incompatible use in any given area, but rather reflects a decision to prioritize resources to ensure permittees and the BLM manage grazing properly in those areas most important to GRSG. If the BLM finds that relevant habitat objectives are not being met due to improper grazing, the BLM will work with the permittee to ensure progress towards habitat objectives.

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will focus on maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives, including completing rangeland health assessments, prioritizing gathers and population growth suppression techniques, and developing or amending Herd Management Area (HMA) plans to incorporate GRSG habitat objectives and management considerations. The BLM will prioritize WHB management first in SFAs, then the remainder of PHMA, and then GHMA. In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.

During the implementation of the ARMPAs, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in GRSG habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain (the actual benefit or gain above baseline conditions) to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action. This standard is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0* published by the FWS in September, 2014, which states that mitigation "should be strategically designed to result in net overall positive outcomes for sage-grouse"**.** Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate) and be implemented on BLM-managed lands in a manner consistent with Departmental guidance for landscape mitigation pursuant to Secretarial Order 3330. If impacts from BLM management actions and authorized third party actions result in habitat loss and degradation that remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.

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To help achieve the mitigation goal of net conservation gain across the range, the BLM will establish GRSG Conservation Teams based on WAFWA Management Zones, including members from the respective states, Forest Service, FWS, and NRCS. These Conservation Teams will facilitate cross-state issues, such as regional mitigation and adaptive management monitoring and response. These Teams will convene to advise on these specific tasks and will utilize existing coordination and management structures to the extent possible.

With regard to the threat of climate change, the ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further these goals and objectives. The Fire and Invasives Assessment Team (FIAT) assessments that informed the ARMPAs and supported the development of the Integrated Rangeland Fire Management Strategy were designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat will increase, thus contributing to increased climate resilience. The SFAs in particular, were identified as key areas to conserve as climate changes. The Oregon ARMPA commits to use climate change science concerning projected changes in species ranges and changes in site capability to adjust expected and desired native species compositions as that information becomes available.

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As identified by the FWS 2010 decision and the COT report, climate change can impact efforts to conserve the GRSG and its habitat in a number of ways. While several ARMPAs acknowledge the potential impact of climate change on GRSG habitat and conservation efforts, specific strategies to address the impacts of climate change are limited. The BLM and Forest Service, in coordination with the FWS, will continue to assess the potential impacts of climate change on GRSG and its habitat and develop strategies to mitigate anticipated effects on GRSG conservation efforts. Changes to management decisions will require a plan revision or amendment, as appropriate.

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1.6.3 Reducing Threats of Rangeland Fire to GRSG and Sagebrush Habitat

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The COT emphasized that "rangeland fire (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency". For this reason, the ARMPAs seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used except under the following conditions: the NEPA analysis for the Burn Plan provides a clear rationale for why alternative techniques were not selected as a viable option, how GRSG habitat management goals and objectives would be met by its use, how the COT Report objectives would be addressed and met, and a risk assessment is prepared to address how potential threats to GRSG habitat would be minimized.

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The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers, et al., 2014b). The final FIAT process report was completed in June 2014 by the Fire and Invasive Assessment Team. The BLM, the Forest Service, FWS, and other cooperating agencies agreed to incorporate this approach into the ARMPAs. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats.

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Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks. Through guidance in the ARMPAs supplemented by the *Integrated Rangeland Fire Management Strategy*, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.

In addition to and complementing the ARMPAs described in this ROD, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department"** (emphasis added). The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes, which are identified by the Fire and Invasives Assessment Tool (FIAT) for the Great Basin Region, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT Assessments provide a list of findings, recommendations, and considerations to protect, maintain, and enhance GRSG habitat. The Assessments also apply recent science and identify highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rangeland Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

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1.6.4 Monitoring, Evaluation, and Adaptive Management

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The COT Report noted that “a monitoring program is necessary to track the success of conservation plans and proactive conservation activities. Without this information, the actual benefit of conservation activities cannot be measured and there is no capacity to adapt if current management actions are determined to be ineffective.” The NTT further notes that “Monitoring is necessary to provide an objective appraisal of the effects of potentially positive conservation actions, and to assess the relative negative effects of management actions to sage-grouse populations and their habitats.”

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A rangewide monitoring and evaluation framework will be established and implemented as described in the Monitoring Framework (Appendix D of each attached ARMPA). This monitoring strategy has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can determine how management decisions and actions implemented through the ARMPAs affect GRSG habitat to determine if the desired management objectives (e.g. avoiding and minimizing additional surface disturbance in PHMAs) have been achieved. Understanding the effectiveness and validating results of ARMPA management decisions is an essential part of the GRSG conservation strategy and provides the means for determining if desired outcomes are being achieved.

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Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions. The WAFWA Zone GRSG Conservation ~~Team~~Teams (as described in Section 1.6.2) will also be used to advise regional monitoring strategies and data analysis as described in the plans.

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Each ARMPA includes an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are habitat and population thresholds and are based on the two key metrics that are being monitored - habitat condition and/or population numbers. At a minimum, the BLM will assess annually whether hard and soft trigger thresholds have been met when the population or habitat information becomes available, beginning after the issuance or signature of this ROD.

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Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the ARMPAs, the BLM will implement more conservative or restrictive conservation measures on a project-by-project basis to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each ARMPA, a soft trigger begins a dialogue between the state, FWS, and the BLM to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a “hard” trigger (which signals more severe habitat loss or population declines).

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Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs. In the event that a hard trigger is tripped, the BLM will implement plan-level decisions, such as allocation changes, to immediately institute greater protection for GRSG and its habitat. If a hard trigger is tripped in a PAC that crosses state boundaries, the WAFWA Management Zone GRSG Conservation Team will convene to discuss causes and identify potential responses.

Comment [JRL7]: They need to act, not simply “advise”.

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In the event that new scientific information becomes available demonstrating that the hard trigger response is insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs, the BLM will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an Instruction Memorandum (IM) or a plan amendment.

1.7 Unique Aspects of the Great Basin ARMPAs

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The ARMPs and ARMPAs and their associated EISs were developed through four planning efforts across the Great Basin Region (as described in Section 1.1). To develop these plans, the BLM employed a landscape-scale approach to achieve a common set of management objectives across the range of GRSG recognizing, in particular, implementing measures to limit anthropogenic disturbance in important habitats. Within this framework, management actions were developed and incorporated into the plans that are tailored to achieve these objectives and accommodate differences in resource conditions, severity of threats, and state-specific management approaches.

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This flexible landscape approach provided the opportunity to incorporate recommendations resulting from collaboration with the states and local cooperators ~~and~~as well as public comments in each planning area. The plans and their future implementation ~~is~~are strengthened by the contributions of local partners and their knowledge, expertise, and experience.

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Measures incorporated into the plans remain consistent with the range-wide objective of conserving, enhancing, and restoring GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat, such that the need for additional protections under the ESA may be avoided.

Below is a brief description of the unique aspects of each of the Great Basin Region’s ARMPAs.

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Idaho and Southwestern Montana

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The Idaho and Southwestern Montana ARMPA adopted specific aspects of the State of Idaho’s Conservation Plan for GRSG. The most significant aspect adopted from the State’s plan is a third category of habitat referred to as Important Habitat Management Areas (IHMA). IHMA are BLM-administered and National Forest System lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations. In a landscape that is most threatened by fire and invasive species, this three-tiered approach allows land managers to focus suppression and restoration resources on those areas of highest importance while providing an acceptable additional level of flexibility in IHMA and GHMA since surface disturbance due to development is not as great a threat to habitat in the sub-region. The three tiers also serve as the foundation for an adaptive management approaches that includes habitat and population hard and soft triggers. The adaptive management approach requires that when a hard trigger is reached, IHMA will be managed as PHMA to maintain sufficient PHMA to support GRSG populations.

The Idaho portion of the Idaho and Southwestern Montana GRSG ARMPA also includes a unique approach to calculating disturbance to account for effective habitat, as described in Appendix E of the attached Idaho and Southwestern Montana ARMPA, which was developed by the BLM in concert with the Idaho Department of Fish and Game, Forest Service, and FWS. The Idaho and Southwestern Montana ARMPA also includes additional Required Design Features (RDFs) based on lek avoidance distances, which were developed in coordination with the Idaho Department of Fish and Game and the local FWS office. Examples include avoiding building new wire fences within 2 km of occupied leks and placing new, taller structures out of line of sight or at least one kilometer from occupied leks. The BLM will also work with the state of Idaho in setting priorities for the review and processing of grazing permits/leases in SFAs consistent with the methodology recommended by the State of Idaho in its proposed plan for the management of BLM-administered lands in the state.

On August 7, 2015, the Sawtooth National Recreation Area and Jerry Peak Wilderness Act (H.R. 1138) was signed into law. In accordance with the Wilderness Act (16 U.S.C. 1131 *et seq*.), certain Federal lands in the Challis National Forest and Challis District of the Bureau of Land Management in the State of Idaho, were designated as wilderness, as a component of the National Wilderness Preservation System, known as the Jim McClure-Jerry Peak Wilderness. Approximately 12,430 acres of this wilderness area fall within BLM-administered PHMA~~ (as a subset of~~, which is all SFA~~). The ARMPA decisions for this~~. This area will now also be managed as Wilderness consistent with the Wilderness Act. As specified in the Sawtooth National Recreation Area and Jerry Peak Wilderness Act, a wilderness management plan will be developed within 5-years of the signing of the Act and it will outline specific management guidance for the new wilderness area.

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This bill also released the Jerry Peak West, Corral-Horse Basin, and Boulder Creek Wilderness Study Areas (WSAs) and they are no longer subject to management pursuant to Section 603(c) of the FLPMA. The acres released as ~~WSA~~WSAs include approximately ~~X~~71,194 acres of PHMA, ~~X~~11,923 acres of IHMA, and ~~X~~5,912 acres of GHMA. The ARMPA decisions for these areas will not change as a result of the release.

Comment [MA9]: Getting clarification on this

Finally~~, in accordance with the Recreation and Public Purposes Act,~~ the Sawtooth National Recreation Area and Jerry Peak Wilderness Act also ~~conveyed~~directed the BLM to convey certain public lands to Blaine County, Custer County, the City of Challis, the City of Clayton, and the City of Stanley. ~~This conveyance included~~These conveyances include approximately ~~35~~53 acres of PHMA, 10 acres of IHMA, and 828 acres of GHMA that are reflected in the ARMPA as being administered by the BLM. ~~Through future plan maintenance,~~Once conveyed, the BLM will adjust the maps and acres as they appear in the ARMPA through plan maintenance to depict that these lands are not subject to the management decisions outlined in the Idaho and Southwestern Montana GRSG ARMPA.

The decisions affecting Southwestern Montana in the ARMPA consistent with the objectives of the Montana Sage Grouse Habitat Conservation Program (Montana Office of the Governor Executive Order No. 10-2014) by establishing conservation measures and strategies to minimize disturbance and habitat loss, particularly as a result of surface disturbance from energy exploration and development. The BLM plan will permit the disturbance limit to go from a 3% to a 5% disturbance cap, consistent with the Montana Plan when the process for implementing their disturbance calculation methodology is instituted and effective. Additionally, if the BLM finds that the State of Montana is implementing an effective GRSG habitat conservation program, the BLM would review their management actions to determine if additional sage-grouse related management actions should be adjusted with coordination from the State of Montana and the FWS to achieve consistent and effective conservation across all lands, regardless of ownership.

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Nevada and Northeastern California

The Nevada portion of the Nevada and Northeastern California ARMPA is unique from other Great Basin ARMPAs because of how the sub-regional habitat map was developed. The ARPMA uses the “2014 Coates Maps”, developed locally using the best available science, and included “Other Habitat Management Areas”, where required design features will be applied at the project level. Decisions for BLM-administered lands in the State of California include allocations and management direction that is generally similar to other ARMPAs in the Great Basin, while carrying forward some decisions identified in the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).

Decisions for BLM-administered lands in the State of Nevada incorporate key elements of the State of Nevada Greater Sage-Grouse Conservation Plan (State of Nevada 2014) including consideration of the State of Nevada Conservation Credit System (Nevada Natural Heritage Program and Sagebrush Ecosystem Technical Team 2014) as the ARMPA is implemented and as projects are proposed within the planning area. This mitigation strategy focuses restoration efforts in the key areas most valuable to the GRSG. The ARMPA adopts a Disturbance Management Protocol (DMP) to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, State of Nevada, and FWS. The plan provides for this exception due to the development of mitigation tools in Nevada, including the Conservation Credit System, in collaboration with the FWS. Furthermore, given the concurrence of the Nevada Department of Wildlife and FWS in each exception, this approach is consistent with conservation objectives. The Disturbance Management Protocol in BLM-administered lands in Nevada was also deemed sufficient such that the Nevada ARMPA does not utilize a disturbance density cap, which is required in the three other Great Basin Region ARMPAs.

In coordination with the FWS, the Nevada ARMPA also allows for an exception to the geothermal NSO which is an energy development priority for the state and is projected to create very limited disturbance in predictable areas over the life of the plan. For those reasons, this exception is consistent with overall conservation objectives.

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Utah

The Utah ARMPA incorporates a number of key strategies for GRSG conservation developed by the State of Utah (Conservation Plan for Greater Sage-Grouse in Utah) and the State of Wyoming (Executive Orders 2011-05 and 2013-3), which establishes conservation measures for protecting GRSG and also focuses conservation and restoration within key areas deemed most valuable to GRSG. The Utah ARMPA also integrates the state's strategic focus on increasing areas available to GRSG through vegetation treatments and reducing threats from wildfire. The ARMPA provides additional flexibility for development in GHMA because 96% of the breeding GRSG in Utah are within PHMAs where conservation measures are applied in a more targeted manner at the project-implementation stage through the use of lek buffers and required design features as well as requiring that compensatory mitigation achieve a net conservation benefit outcome. As such, the Utah ARMPA designates GHMA as open to wind energy and high voltage transmission ROW development (consistent with the net-conservation-gain mitigation framework for the ARMPA). The Utah ARMPA also designates GHMA open to oil and gas development with standard constraints.

Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat.

Oregon

The Oregon ARMPA incorporates key elements of the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Hagen 2011) which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. The BLM plan adopts the unique disturbance cap approach developed with the State of Oregon in which disturbance is capped at 1% per decade, in addition to the 3% cap in BSUs and project analysis areas.

The BLM Oregon plans provide additional flexibility for wind development in PHMA in Harney, Lake, and Malheur counties by allowing avoidance rather than exclusion within PHMAs that are outside of the SFAs. The BLM provided this flexibility after recognizing the extent of high and medium potential wind areas in these counties that is in PHMAs, the fact that wind energy is excluded in SFAs in these counties, and, after coordination with the USFWS, determining that the more rigorous disturbance cap (in which disturbance is capped at 1% per decade) and adaptive management triggers adopted by the Oregon plan would compensate for the limited wind development likely to occur in these areas. In addition, the plan encourages development of wind energy ROWs outside of PHMA first, or in non-habitat areas within PHMA, before development is permitted in higher value habitat areas. Due to these factors, the BLM finds these limited areas of flexibility for wind development are not inconsistent with overall conservation objectives of the plan. In addition, the Oregon ARMPA identifies strategic areas where habitat enhancement and restoration activities are encouraged, as well as other strategic areas to address the impacts associated with climate change.

For additional information regarding the unique aspects of each plan, refer to Table 1-6 of the attached Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah ARMPAs, which provides a crosswalk regarding how the ARMPAs address specific threats to GRSG identified in the COT Report through these state-specific management prescriptions.

Comment [10]: Hotlink.

1.8 Decision Rationale

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The ARMPAs provide a comprehensive and effective conservation strategy for addressing the threats identified by the FWS such that the need for additional protections under the ESA may be avoided. The ARMPAs contain objectives which strive to conserve the GRSG and its habitat on BLM-administered lands across the remaining range of the species consistent with measures identified or recommended in the NTT or COT reports.

In combination with the sage-grouse conservation actions taken by the individual states within the remaining range of the species and separate but connected initiatives to address the threat of rangeland fire to curb the ~~continuing~~ spread of non-native invasive grasses, and to promote conservation measures to benefit the Greater sage-grouse on private lands, the BLM and Forest Service proposed ARMPAs are an essential component of the effort to conserve the GRSG and its habitat. Combined, all of the ARMPAs associated with the BLM's National GRSG Conservation Strategy would affect approximately 66 million acres of the remaining habitat for the species.

The BLM Greater Sage-Grouse Conservation Strategy is built upon the following key concepts:

- **Landscape-level**: The planning effort encompasses the remaining habitat of the GRSG on BLM-administered public lands, covering 10 western states in the Great Basin and Rocky Mountain regions. As such, the strategy provides a coherent framework across the BLM RMPs to implement landscape-level conservation for GRSG while allowing for flexibility essential to effectively address threats to the GRSG in the context of the agency's multiple use and sustained yield mandates under FLPMA. The conservation measures included as part of this landscape-level conservation effort address identified threats to the species, recognizing local ecological conditions, and incorporating existing conservation efforts where they are consistent with the overall objective of conserving ~~the Greater sage-grouse~~GRSG across its remaining range.
- **Best Available Science** – The ARMPAs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT Report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat. The BLM National Technical Team (NTT) Report provided additional guidance for addressing the most significant threats to the GRSG. A series of

Formatted: Indent: Left: 0.25", Hanging: 0.25", Outline numbered + Level: 1 + Numbering Style: Bullet + Aligned at: 2.75" + Indent at: 1" subsequent reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the WAFWA, as well as a report to the Secretary of the Interior entitled "An Integrated Rangeland Fire Management Strategy" also informed the GRSG conservation.

- **Targeted, Multi-Tiered Approach** – The ARMPAs were designed to incorporate a layered management approach to target habitat protection and restoration efforts to the most important habitat management areas as determined by state and federal sage grouse experts, largely consistent with the Priority Areas for Conservation (PACs) identified in the COT Report, where land allocations and management direction avoid and minimize additional surface disturbance. These areas are designated as Priority Habitat Management Areas (PHMAs). Within PHMA, the ARMPAs/ARMPs provide an added level of protection to eliminate most surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. General Habitat Management Areas (GHMAs), recognize the potential value of habitat areas outside of PACs -- as recommended by the COT -- where surface disturbance is minimized -while providing greater flexibility for other land resource uses.
- **Coordinated**: The ARMPAs were developed through a joint planning process between the BLM and the Forest Service (as a cooperating agency). As a result, federally-administered ~~landsessential~~lands essential to the conservation of the GRSG are managed in a coordinated manner. The FWS provided guidance and input throughout the process to aid land managers in understanding the threats to the GRSG and its habitat. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative**: The ARMPAs reflected extensive input from the relevant states, collaborators, and stakeholders and the public from the outset. The ARMPAs were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Western Governors Association Sage Grouse Task Force (SGTF) was particularly useful in facilitating this kind of collaborative input. The ARMPAs incorporate state and local conservation measures where they are consistent with the overall objective of implementing land use plan conservation measures for the GRSG consistent with the multiple-use and sustained-yield mission of the BLM.

Comment [JRL11]: Important element in both "rationales".

The conservation measures in the ARMPAs reflect over a decade of research, analysis and recommendations for GRSG conservation including those produced by the WAFWA, the NTT, and the COT. Each of these entities produced a strategy or report that was developed through a collaborative effort of state and federal biologists and scientists with extensive experience and expertise in GRSG management and research.

The COT Report –which identified threats to GRSG habitat as well as the most important habitat to protect--provided an important framework for development of the conservation strategy embodied in the sub-regional ARMPAs. The COT, consisting of state and federal scientists, wildlife biologists, resource managers, and policy advisors, was tasked by the Director of the FWS "with development of range-wide conservation objectives for the sage-grouse to define the degree to which threats need to be reduced or ameliorated to conserve sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future."

In addition, the Fire and Invasives Assessment Team (FIAT) Report and the USGS compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on GRSG populations -- *Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review*, and the *Integrated Rangeland Fire Management Strategy: Final report to the Secretary* (Manier et al, 2014; DOI 2015b) provided important guidance in the development of critical aspects of the proposed ARMPAs/ARMPs and the overall GRSG landscape-level conservation strategy. Beyond these range-wide reports, each of the sub-regional plans used local science, where available, to tailor plan elements to reflect local ecological conditions, threats, and GRSG experience where consistent with the overall GRSG management objectives.

Comment [12]: Hotlink

The BLM ARMPAs are the product of extensive coordination, including the active engagement of the FWS in helping to inform land allocation and related management decisions by the land management agencies to ensure they limit or eliminate new surface disturbance as well as improve habitat condition in the most important habitat areas. The ARMPAs/ARMPs also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, approaches, and priorities in each. While the effort to incorporate state-developed conservation measures in each of the sub-regional plans has added complexity in developing the overall conservation strategy, the body of local knowledge and expertise regarding conservation measures for the GRSG is extensive and, ultimately, strengthened the plans. Incorporating these measures in the plans is also likely to increase the commitment of all partners to the difficult task of implementing the plans upon completion.

In his transmittal letter accompanying the final COT report, FWS Director Dan Ashe reaffirmed his charge, "I asked the team to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. … Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."

The ARMPAs are designed to directly address the specific threats to the species identified by the FWS in its 2010 listing determination as more fully explained in the COT Report, and the BLM NTT Report. As previously noted, the COT Report stated, "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation." Specifically, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT further recommended an "avoidance first strategy" and stressed that "threats in PACs must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

Comment [JRL13]: Strike as explained in RM ROD.

In order to address the identified threats and meet the recommendations of the COT, the plans are based first on the identification of important habitat areas for GRSG in which the plans protect remaining habitat and target habitat restoration and improvement actions. Specifically, the plans identify PHMA which align closely with PACs identified in the COT Report (except for PACs in Nevada and Utah, as specified on page 13 of the COT Report). Within PHMA, the plans identify SFAs based on the FWS analysis of strongholds for the species based on population density, habitat integrity, and resilience to climate change among other factors. The SFAs serve as a landscape-level anchor for the conservation strategy and are closed or excluded from discretionary surface disturbances. SFAs are also used to prioritize fire protection, habitat restoration, and other habitat management actions (e.g., prioritizing reductions in wild horse and burro populations to achieve AML). This approach will allow the BLM to target limited resources to those areas identified by the FWS which are most important to long-term ecosystem health and species persistence.

PHMA and GHMA boundaries are based on Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) (except in Utah, where PPH was derived from occupied habitat). Consistent with BLM's Instruction Memorandum 2012-044, PPH and PGH are based on data and maps developed through a collaborative effort between the BLM and the respective state wildlife agency. PPH and PGH (PHMA and GHMA in the Final EISs and now the ARMPAs) were developed using the best available data. Criteria for delineating PPH included breeding bird density (Doherty 2010), sage grouse proportionality, density of leks, and key seasonal habitats, such as known winter concentration areas. PGH (now GHMA) are areas of occupied seasonal, connectivity, or year-round habitat outside of PPH.

Allocations and management actions are targeted to habitat management areas to limit or eliminate surface disturbance. All forms of new development in PHMA – from energy, to transmission lines, to recreation facilities and grazing structures are excluded, avoided, or allowed only if the resultant effect is neutral or beneficial to the GRSG. In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated with habitat protection or restoration activities that produce a net conservation benefit for the GRSG. The ARMPAs/ARMPs will also prioritize future oil and gas leasing and development outside of identified GRSG habitat management areas (i.e., SFAs, PHMAs, and GHMAs) to reduce the potential for future conflict with GRSG.

In addition, the ARMPs and ARMPAs include measures to limit surface disturbance in PHMA through the establishment of disturbance limits or "caps" and density restrictions of on average 1 energy facility per 640 acres, as well as lek buffers. These requirements reflect recommendations contained in the NTT Report and are consistent with certain state strategies that were already in place before the initiation of the BLM's National GRSG Conservation Strategy. As described in Section 1.6.1, BLM determined the appropriate lek buffers to analyze based on the USGS report *Conservation Buffer Distance Estimates for GRSG – A Review* (Manier et al, 2014) based on best available science.

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The plans also include actions meant to improve habitat condition to the most important areas for conservation through additional, targeted efforts to protect and restore habitat first in SFAs, then in PHMAs, and finally in areas designated as GHMAs.

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Mitigation for activities adversely impacting GRSG or GRSG habitat in PHMA or GHMA will be designed to a net conservation gain standard consistent with the recommendation included in the September 2013 FWS document, *Greater Sage-Grouse Range-Wide Mitigation Framework*. According to the authors, the Framework was prepared …

> "to communicate some of the factors the Service is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to GRSG. The recommendations provided here are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report for sage-grouse".

Grazing, which is the most widespread use of the sagebrush ecosystem, will continue in a manner consistent with the objective of conserving the GRSG. Land health standards will incorporate GRSG habitat objectives and vegetative management objectives consistent with the ecological potential of the landscape as recommended by the COT to …

> "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for GRSG (e.g. shrub cover, nesting cover)."

The ARMPAs also address the adverse impacts of free-roaming equids (wild horses and burros) on GRSG habitat by prioritizing gathers and removal of wild horses and burros to achieve AMLs in SFAs, PHMAs, and GHMAs (in that order). The BLM has been working with the National Academy of Sciences to conduct new research of methods to reduce wild horse and burro reproduction rates. Through a combination of targeted gathers and the development of an effective agent for controlling future free-roaming equid reproductive rates, over time, this threat to GRSG may be effectively managed.

Since the interaction of fire and invasive species represents the greatest threat to GRSG survival in the Great Basin region, the ARMPAs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire, including fire prevention and the restoration of habitats impacted by fire. The Department took a series of actions over 2014 and 2015 to develop a more complete and comprehensive strategy for dealing with this threat that led to Secretarial Order (S.O.) 3336 and subsequent report, *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary of the Interior*.

http://www.forestsandrangelands.gov/rangeland/documents/IntegratedRangelandFireManagementStrategy_FinalReportMay2015.pdf

In accordance with the S.O. and subsequent rangeland fire management strategy, substantial changes in policy and management direction affecting all aspects of the rangeland fire management program – from better coordination between resource managers and fire management officers; to the identification and prioritization of prevention, suppression, and restoration efforts in SFAs, PHMAs, and GHMAs; to the commitment of additional equipment and crews for rangeland firefighting; to additional funding and policy direction to improve post-fire restoration; to the completion of an initiative to collect, store, and better utilize native seed and sagebrush in post-fire restoration of sagebrush steppe ecosystems. This effort, and the initiative to fight the spread of non-native invasive species that contributes to higher rangeland fire risk (e.g. cheatgrass) discussed below, has fundamentally changed how rangeland fire is managed to benefit sagebrush ecosystems and GRSG habitat.

The COT report – and other more recent research and analysis – amplify concern for the contribution of cheatgrass and other invasive annual species to the loss of GRSG habitat associated with increased fire frequency and intensity. Work initiated by the WAFWA and based on recent research by

Chambers (Chambers et al, 2014b) led to the development of the Fire and Invasives Assessment Tool (FIAT) and a subsequent assessment that identified areas of resistance and resilience to fire within SFAs, PHMAs, and GHMAs. Through use of the FIAT Assessment/Tool, land managers can more efficiently allocate and use fire resources at initial attack, to stop fire early and prevent catastrophic habitat loss as well as target restoration to those areas important to the species where success is more likely. The BLM is also committed to and accelerating the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasive annual species.

Even prior to completion of the FIAT assessment, BLM shifted funding for fuels management to protect landscapes of importance to the GRSG. Under the FY2014 Omnibus Appropriation, BLM prioritized the funding of treatments and activities within each state that benefit GRSG (See **Figure 1-6)**.

In addition, the Sage Grouse Initiative (SGI) launched by the Natural Resources Conservation Service in 2010 also contributes to the effort to protect and restore important GRSG habitat. In collaboration with the states and private landowners on private lands, as well as with the BLM and USFS on federally-administered public lands, NRCS has worked to reduce the encroachment of pinyon-juniper trees and restore rangeland habitat on private and BLM-administered lands.

[Insert Figure 1-6. FY 2015 FIAT Priority Project Planning Areas with Focus on Invasive Annual Grasses and Conifer Expansion Assessments.]

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To further supplement these efforts, the Department has recently committed $7.5 million to projects in GRSG habitat to create more resilient landscapes and BLM has allocated $12 million to increase firefighting resources aimed at stopping fires while they are small in the Great Basin. The Department has identified required policy changes to increase the commitment, flexibility and ~~timeframe~~time frame for use of Emergency Stabilization and Burned Area Restoration (ES & BAR) funding on priority sagebrush-steppe habitats.

Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy,* the BLM and Forest Service conservation strategy places heavy reliance on monitoring and evaluation to assess the success and effectiveness of implementing the management decisions in the ARMPAs. Monitoring plans will be developed in coordination with relevant state and federal agencies and will incorporate evaluation of GRSG population trends by the states and changes in habitat condition by the federal land management agencies. As the WAFWA report states …

> Monitoring provides the "currency" necessary to evaluate management decisions and to assess progress or problems. Adequate monitoring should be considered an integral and inseparable component of all management actions, and there, not optional. Lack of proper monitoring will undoubtedly hinder this large-scale conservation effort.

In addition, the ARMPAs incorporate an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should changes in population levels or habitat conditions occur. If the project-level management responses to soft triggers do not adequately address the causes for population or habitat declines and “hard triggers” are reached, the ARMPAs identify measures that will be put in place, including plan-level responses, in an effort to reverse the declines.

In summary, the ARMPAs emphasize an “avoidance first” strategy~~”~~ consistent with the recommendations in the COT Report by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is accomplished through identification of important GRSG habitat areas and then applying allocations that exclude or avoid surface disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which although more difficult and requiring a longer time frame, are important to the long-term conservation of GRSG. Restoration decisions include specific habitat objectives, and a priority on treating GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* as well as NRCS’ Sage Grouse Initiative (SGI) investments in private landowners’ conservation efforts. This strategy reflects a high level of commitment by federal partners to conserve the GRSG and its habitat. These actions on over half of the most important lands for GRSG conservation will serve as an anchor and complement the significant actions being taken by state and local governments as well as private landowners to conserve the species and its habitat.

The landscape-level strategy consisting of new conservation actions that will go into effect through the BLM ARMPAs as well as actions being implemented currently to conserve the species, reflect a significant change in management direction and philosophy for both resource management agencies since 2010 and a long-term commitment to assure the conservation of the species consistent with the objectives set in the 2006 WAFWA conservation strategy and embraced by both the NTT and the COT.

This change represents a new paradigm in managing the sagebrush landscape for the BLM and amplifies the need for collaboration among federal, state, tribal, and private partners to conserve the GRSG consistent with direction articulated in the NTT report:

“Land uses, habitat treatments, and anthropogenic disturbances will need to be managed below threshold necessary to conserve not only local sage-grouse populations, but sagebrush communities and landscapes as well. Management priorities will need to be shifted and balanced to maximize benefits to sage grouse habitats and populations in priority habitats. Adequacy of management adjustments will be measured by science-based effectiveness monitoring of the biological response of sagebrush landscapes and populations. Ultimately, success will be measured by the maintenance and enhancement of sage-grouse populations well into the future.”

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The conservation benefits to the sagebrush ecosystem and GRSG habitats resulting from the BLM ARMPs and ARMPAs provide an essential foundation for conserving the GRSG which, in conjunction with the amended Forest Service LRMPs, affect nearly two-thirds of GRSG habitat across the remaining range of the species. In conjunction with similar conservation efforts by other federal and state agencies, private landowners, and local partners, the BLM National GRSG Conservation Strategy constitutes an historic conservation effort that will benefit more than 350 species and the sagebrush ecosystem upon which they depend. It is through collaborative efforts to conserve the imperiled sagebrush ecosystem that conservation of the GRSG and other sagebrush obligate species can best be achieved and the listing of the ~~Greater sage-grouse~~GRSG under the ESA may be avoided.

Comment [JRL14]: I suggest this closing paragraph for both RODs. Makes the point that ecosystem conservation is the best chance to avoid a listing… without saying it will.

1.9 Implementation

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~~1.9.1 Additional Implementation Guidance and Considerations~~

~~*Continued commitment to research and use of best available science:* Through implementation of this strategy, new management issues and questions are likely to arise that may warrant additional guidance and/or study by technical experts, scientists, and researchers. The BLM is committed to continue to work with individuals and institutions with expertise in relevant fields in order to ensure that land and resource management affecting conservation of the Greater sage-grouse and the sagebrush ecosystem continues to be guided by sound, peer-reviewed research and the best available science. [May want to link to DOI and/or BLM science policy]~~

~~Implementation, after a BLM RMP or RMP amendment is approved, is a continuous and active process.~~Future decisions made in conformance with the ARMPAs serve to continuously and actively implement its provisions. Decisions presented as Management Decisions can be characterized as *immediate* or *one-time future* decisions.

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Immediate Decisions: These decisions are the lands use planning decisions that go into effect upon signature of the ROD. These include goals, objectives, allowable uses and management direction, such as the allocation of lands as open or closed for saleable mineral sales, lands open with stipulations for oil and gas leasing, and OHV area designations. These decisions require no additional analysis and guide future land management actions and subsequent site specific implementation decisions in the planning area. Proposals for future actions such as oil and gas leasing, land adjustments, and other allocation-based actions will be reviewed against these land use plan decisions to determine if the proposal is in conformance with the plan.

One-Time Future Decisions: These types of decisions include those that are not implemented until additional decision-making and site-specific analysis is completed. Examples are implementation of the recommendations to withdraw lands from locatable mineral entry or development of travel management plans. Future one-time decisions require additional analysis and decision-making and are prioritized as part of the BLM budget process. Priorities for implementation of "one-time" RMP decisions will be based on several criteria, including:

- Current and projected resource needs and demands,
- National BLM management direction, and
- Available resources.

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General Implementation Schedule of "One-Time" Decisions: Future Decisions discussed in the attached ARMPAs will be implemented over a period of years depending on budget and staff availability. After issuing the ROD, BLM will prepare implementation plans that establish tentative timeframes for completion of "one-time" decisions identified in these ARMPs and ARMPAa. These actions require additional site specific decision-making and analysis.

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This schedule will assist BLM managers and staff in preparing budget requests and in scheduling work. However, the proposed schedule must be considered tentative and will be affected by future funding, changing program priorities, non-discretionary workloads, and cooperation by partners and external publics. Yearly review of the plan will provide consistent tracking of accomplishments and provide information that can be used to develop annual budget requests to continue implementation.

1.9.1 Additional Implementation Guidance and Considerations

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Instructional Memoranda – Additional instruction and management direction will be necessary to implement certain land allocation decisions and ~~management~~ direction included in the ARMPAs. For example, additional guidance will be provided to clarify how the Bureau will implement the objective of prioritizing future oil and gas leasing and development outside of GRSG habitat. Instructional Memoranda (IM) and related guidance will be completed by the BLM-Washington office. ~~Presently,~~The BLM intends to complete IMs for the following management direction ~~are anticipated:~~ within 90 days of the RODs: oil and gas leasing and development prioritization~~,~~ and livestock grazing. Other IMs, including, monitoring, and mitigation, will be developed as necessary. Issuance of this national guidance will supersede any related national and field level guidance currently in effect. Additional national, state and field level guidance will be developed as necessary to implement the decisions in the plans.

~~*Transmission lines* – Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of a limited number of Presidential priority lines (Gateway West, Boardman to Hemingway, and Transwest Express, including those portions of Gateway South that are co-located) have been underway for a several years. These lines are critical to expanding access to renewable sources of energy (especially wind) and to improving the reliability of the Western grid, and therefore, planning for these lines is proceeding through NEPA analysis in a separate authorization process. Conservation measures for GRSG are being analyzed as part of those NEPA processes, which should achieve a net conservation benefit for GRSG. Conservation measures to achieve this may include micro-siting to adjust the route to avoid important habitat and leks, transmission tower design to minimize the potential for adverse impacts to GRSG such as perching for predators, and compensatory mitigation measures, such as habitat restoration and pre-suppression activities to reduce the risk of habitat loss due to fire, to offset any unavoidable impacts to a conservation gain standard.~~

~~*Wild horses and burros* – Recognizing the potential for free-roaming equids to adversely impact sage-grouse habitat, the decisions emphasizes the need to focus on maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve habitat management objectives, focusing first in SFAs and PHMAs.~~

~~*Grazing* – Changes in grazing management will occur when authorizations are renewed or modified to meet land health standards, including sage-grouse habitat standards. Changes will be made in accordance~~

~~with regulatory processes. Therefore, there will be no immediate change in grazing management or modification of term grazing permits and leases upon signing this ROD. As stated in the ARMPAs and ARMPs, the BLM will prioritize review of livestock grazing management in SFAs and PHMAs and implement changes as needed. All BLM grazing use authorizations will contain terms and conditions regarding the actions needed to meet or make significant progress toward meeting the habitat objectives. If an evaluation of monitoring and assessment information shows that the objectives are being met or there is a trend towards meeting the objectives, then no adjustments to the current use and management is required. If the evaluation shows the habitat objectives are not met nor is there progress towards meeting them, then the cause for not meeting the objectives will be identified. If it is determined that the current authorized livestock management or level of use is a significant cause, the use will be adjusted in accordance with the response specified in the instrument that authorized the use, or as described in a NEPA document. The BLM will prioritize the review of grazing authorizations in SFA and PHMA in particular, focusing on those containing important riparian habitats and those not meeting Land Health Standards, to determine if modification is necessary prior to renewal of the authorization. Renewed or modified grazing authorizations in SFA and PHMA will include terms and conditions specifically designed to meet objectives identified in the GRSG Habitat Objectives Table based on ecological site potential and Land Health Standards. One or more defined responses to exceeding specific management thresholds will be subjected to NEPA analysis during the grazing authorization renewal or modification process, which will allow the authorized officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. The BLM will include additional management direction for implementing grazing management actions in the ARMPs in an Instructional Memorandum.~~

Map Adjustment and GRSG Seasonal Habitats – PHMA was designed to include breeding bird density, sage-grouse proportionality, density of leks, and key seasonal habitats, such as known winter concentration areas, and GHMA was designed to include the areas of occupied seasonal, connectivity, or year-round habitat outside of PHMA. As additional important habitats are identified, the BLM will map, and incorporate these -habitats for GRSG, consistent with best available science, through subsequent plan revisions or amendments, as appropriate. Priority should be given to ensuring that wintering habitat is identified and captured in all changes in habitat maps subsequent to this decision. In the interim, the BLM will use the existing maps for all decisions.

~~*Climate Change Effects on GRSG Conservation* – As identified by the FWS 2010 decision and the COT report, climate change can impact efforts to conserve the GRSG and its habitat in a number of ways. While several ARMPAs acknowledge the potential impact of climate change on GRSG habitat and conservation efforts, specific strategies to address the impacts of climate change are limited. The BLM and Forest Service, in coordination with the FWS, will continue to assess the potential impacts of climate change on GRSG and its habitat and develop strategies to mitigate anticipated effects on GRSG conservation efforts. Changes to management decisions will require a plan revision or amendment, as appropriate.~~

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Continued Commitment to Research and Use of Best Available Science: Through implementation of this strategy, new management issues and questions are likely to arise that may warrant additional guidance and/or study by technical experts, scientists, and researchers. The BLM is committed to continue to work with individuals and institutions with expertise in relevant fields in order to ensure that land and resource management affecting conservation of the GRSG and the sagebrush ecosystem continues to be guided by sound, peer-reviewed research and the best available science.

Training -- Given the nature and complexity of the management direction in these ARMPAs, the BLM, in collaboration with the Forest Service and the FWS, will develop and implement a schedule of trainings for key functions, actions, and decisions associated with these plans. In this manner, the BLM will seek to better inform its personnel, partners, cooperators, and stakeholders of the changes in management that will result from this new management paradigm.

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments 1 through 4). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in **Sections 1.3** of attachments 1 through 4.

The land use decisions conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses

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- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not available for certain uses and are also used to prioritize conservation and restoration management actions. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Management decisions/actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands, including but not limited to stipulations, guidelines, best management practices (BMPs), and required design features.

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The ARMPAs' management decisions were crafted to incorporate conservation measures into LUPs to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing identified threats to GRSG and their habitats (see **Section 1.3**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

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The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for land use plan level travel management area decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs and ARMPs do not violate valid existing rights.

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The ARMPAs do not contain decisions for the mineral estates that is not administered by the BLM. ARMPA decisions for surface estate only apply to BLM managed lands. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

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- *Statutory requirements*. The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy*. The decision will not change BLM's obligation to conform to current or future National policy.

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- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

The ARMPAs in the Great Basin Region include minor modifications and clarifications to the Proposed RMPs and RMP Amendments. These minor modifications and clarifications were made as a result of internal reviews, response to protests, and recommendations provided to the BLM during the Governors' consistency review. These modifications and clarifications are hereby adopted by this ROD.

The following modifications/clarifications were made to all of the ARMPAs in the Great Basin Region.

- ARMPA Formatting: The plans were reformatted between the Proposed RMPA and ARMPA planning stages for consistency across the Great Basin Region; the order of management actions and the prefixes for the goals, objectives, and management actions were changed in the ARMPAs to provide consistency among the amendments and revisions for GRSG goals and objectives.
- U.S Forest Service References (applicable only to the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah ARMPAs): All references to National Forest System lands in both text and on maps have been removed from the ARMPAs. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plan Amendment under their planning authorities.
- Fire: Management actions/decisions were modified to stress that the protection of human life is the single, overriding priority for fire and fuels management activities.
- Livestock Grazing: The following statement, "This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3," was added to the management action/decision which reads, "At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks."
- Glossary: Numerous glossary definitions were deleted due to the fact that the terms were not used/referenced in the ARMPAs. If not already contained in the Proposed RMPAs' glossary, the following terms and definitions were added to the glossary for clarification:

Comment [SMC15]: These may have minor changes - additional rationale based on the protests and GCR – finalizing this week

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    - Grazing Relinquishment: the voluntary and permanent surrender by an existing permittee or lessee, (with concurrence of any base property lienholder(s)), of their priority (preference) to use a livestock forage allocation on public land as well as their permission to use this forage. Relinquishments do not require the consent or approval by BLM. The BLM's receipt of a relinquishment is not a decision to close areas to livestock grazing.
    - Transfer of Grazing Preference: the BLM's approval of an application to transfer grazing preference from one party to another or from one base property to another, or both. Grazing preference means a superior or priority position against others for the purposes of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee.
    - Valid Existing Right: Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, rights-of-way, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.
    - Mining Claim: A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.
    - Energy or Mining Facility: Human constructed assets designed and created to serve a particular function and to afford a particular convenience or service that is affixed to a specific locations, such as oil and gas well pads and associated infrastructure.
- GRSG Habitat Mapping: Information was added to the ARMPAs to specify that when new information becomes available about GRSG habitat, including seasonal habitats, in coordination with the state wildlife agency and FWS, and based on best available scientific information, the BLM may revise the GRSG habitat management area maps and associated management decisions through plan maintenance or plan amendment/revision, as appropriate.
- Adaptive Management: The Greater Sage-Grouse Adaptive Management Strategy was revised to include a commitment that the hard and soft trigger data will be evaluated as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.
- Vegetation: The desired condition for maintaining a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover in SFAs and PHMAs was modified to read as follows: "In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6)."

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- GRSG Habitat Objectives: For clarification purposes, within each of the ARMPA GRSG Habitat Objectives Tables, native bunchgrasses was provided as an example of a perennial grass cover and the inclusion of residual grasses was added to the perennial grass cover and height objective.
- Sagebrush Focal Areas: Examples of the types of vegetation and conservation actions that will be prioritized within SFAs were provided for clarity in the management action/decision. These examples include land health assessments and wild horse and burro management and habitat restoration actions.
- Required Design Features: One of the criteria for demonstrating that a variation to an RDF is warranted was modified to include the following statement, "An alternative RDF, a state-implemented conservation measure or plan-level protection is determined to provide equal or better protection for GRSG or its habitat."
- Lands and Realty: The following management actions/decisions and objectives were calrified:
  - Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.
  - Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.
- Land Tenure: Management action associated with land disposals was clarified to include land exchanges as a means of disposal.
- WAFWA GRSG Conservation Team. Additional clarification was added to ARMPAs related to the WAFWA GRSG Conservation Teams that were identified in the Proposed RMPAs: "WAFWA management zones will be used to facilitate cross-state issues, such as regional mitigation and adaptive management monitoring and response, through WAFWA GRSG Conservation Teams (Teams). These Teams will convene to advise on these specific tasks and will utilize existing coordination and management structures to the extent possible."
- Cheatgrass: The following management action was included consistent with the purpose and need and objectives of the ARMPAs: "Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species."
- Valid Existing Rights: The following management action was added to the ARMPs and ARMPAs: "Consider the potential for the development of not-yet-constructed valid existing rights of surface disturbing activities as defined in Table 2 of the Monitoring Framework prior to authorizing new projects in PHMA."

Additional modifications and clarifications specific to each sub-region ARMPA are summarized below.

2.4.1 Idaho and Southwestern Montana

General Changes

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- All exception language that was in the FEIS in various places was grouped into a stipulation appendix and added it to the ARMPA as Appendix G Stipulations.
- Appendix G Anthropogenic Disturbance and Adaptive Management from the Proposed RMPA, which is now Appendix E in the ARMPA was modified to delete the reference to Tables 2 to 7. Tables 2 to 7 were deleted from the FEIS Appendix G before it was made available to the public for protest, but the reference was not deleted in text of the Appendix. This discrepancy was identified during protest resolution and by the Governor during the Governor's Consistency Review. These values will be calculated after the signing of the ROD (see Adaptive Management below).
- Many editorial changes including, deleting repeated numbers, spelling errors, etc, were made when finalizing the ARMPA.
- On August 7, 2015, President Barack Obama signed into law the Sawtooth National Recreation Area and Jerry Peak Wilderness Act (H.R. 1138). In accordance with the Wilderness Act (16 U.S.C. 1131 et seq.), certain Federal lands in the Challis National Forest and Challis District of the Bureau of Land Management in the State of Idaho, comprising approximately 116,898 acres, were designated as wilderness, as a component of the National Wilderness Preservation System, known as the Jim McClure-Jerry Peak Wilderness. This bill also released the Jerry Peak West, Corral-Horse Basin, and Boulder Creek Wilderness Study Areas and they are no longer subject to section 603(c) of the FLPMA. In accordance with the Recreation and Public Purposes Act, this law also conveyed public lands to Blaine County, Custer County, the City of Challis, the City of Clayton, and the City of Stanley. The new wilderness area, the release of the WSAs, and the lands that were conveyed by this law were not within the decision area of the Idaho and Southwestern Montana ARMPA, therefore, no changes to the ARMPA have been made as a result of the passage of this law.

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Special Status Species

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- Deleted the Seasonal Timing Restrictions from Appendix C FEIS to reduce redundancy because these restrictions were already in the Required Design Features Appendix.

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Livestock Grazing

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- Livestock Grazing RM-16 and RM 18, which are now MD LG 15 and MD LG 17 respectively in the ARMPA, had the following sentence added as an accepted recommendation made by the Governor during the Governor's Consistency Review to clarify management and conservation action prioritization in SFAs and: "Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFAs followed by areas of PHMA outside SFAs."

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- Lands and Realty LR-14 from the Proposed RMPA, which is now MD LR 13 in the ARMPA, was modified to remove the statement that lands in PHMA, IHMA, and GHMA would only be available for disposal through exchange. This was removed because it was not consistent with BLM policy and the net conservation gain clause in MD LR-13 will provide assurance that disposals through any method would be beneficial to GRSG.

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2.4.2 Nevada and Northeastern California

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General Changes

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- Editorial changes such as changing 'should' to 'shall', and 'would' to 'will' to reflect the final decision language.
- Re-categorizing some of the Management Decisions into other common resource programs. For example, all of the Fire and Fuels management decisions are all numbered under FIRE, and are not split into different sub-category names.
- Re-lettering of the critical Appendices, and deletion of those that are no longer applicable for the ARMPA.

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- Added clarity to MD SSS 2 A 3, by describing what energy and mining facilities to which this decision would apply; taken directly from the Disturbance Appendix E.
- Added clarity to MD SSS 3A, by including references to valid existing rights and applicable law for the requirement of a 'net conservation gain'.
- Specified in MD SSS 8 that this activity would be coordinated with NDOW or CDFW, and that breeding activity surveys would be for actions involving mineral activities and rights-of-ways.
- Deleted Action PR 4 from the Proposed LUPA because BLM does not manage landfills and transfer stations.

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- Under the Brood Rearing/Summer category, it was clarified that the objective of the 7 inch deep rooted perennial bunchgrass in upland habitats was only for a 522-foot (200 meter) area around riparian areas and meadows. The additional reference was added for Casazza et al. 2011
- The footnote #7 was replaced. The original footnote stated that the "specific height requirements needed to meet the objective will be set at the time of HAF assessments". This is incorrect, because the height requirements will need to be set well in advance of the HAF assessments.
- The footnote #7 was replaced with "Any one single habitat indicator does not define whether the habitat objective is or is not met. Instead, the preponderance of evidence from all indicators within that seasonal habitat period must be considered when assessing sage-grouse habitat objectives." This addition was for the purpose of clarification.

Adaptive Management

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- Moved the Adaptive Management Strategy section out of Chapter 2 and made it into Appendix J; moved the Adaptive Management decisions under MD SSS 17 – MD SSS 22.
- Clarified under MD SSS 21 that BLM will coordinate with NDOW, and that the decision was specific to mineral activities and rights-of-way actions.

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Fire and Fuels Management

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- Deleted 'field offices and districts' from MD FIRE 3, as there will be a multi-layer approach to coordination, including BLM State Offices.
- In Objective FIRE 3, added 'in SFAs first' to provide more emphasis to the SFA over the rest of the PHMA for this action.
- Modified MD FIRE 26 to delete 'Districts', as there will be a multi-layer approach to identifying treatment needs for wildfire and invasive species management across the state.
- Added 'FWS' as a coordination entity to MD FIRE 31, when ensuring that proposed sagebrush treatments are coordinated with the BLM and State fish and wildlife agencies.

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Livestock Grazing

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- Management Decision LG 1 was modified for clarity and to include the fact that BLM would conduct appropriate consultation, cooperation and coordination
- Management Decision LG 5 was modified to add supplementary management actions and clarifies that the potential modifications include, "but are not limited to" to actions on the list.
- Management Decision LG 5 was modified to make it clear that the management strategies listed are not limited to just those listed under LG 5 by adding "but are not limited to". This was added to clarify a misunderstanding in a protest letter.
- Management Decision LG 7 was clarified to state that "AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested."
- Management Decision LG 15 was modified to state that removing or modifying water developments must be done "In accordance with state water law and…"

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Mineral Resources

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- Management Decision MR 18 was modified to provide the Barrick Enabling Agreement as an example of appropriate mitigation that can be considered in the future, and the last sentence was removed because it only repeated BLM regulations, and is unnecessary.

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Lands and Realty

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- In order to resolve a protest, MD LR 3 was modified to state that corridors will be 3,500 feet in width… "or a different width is specified for congressional designated corridors". This is in response to the Lincoln County Conservation Recreation Development Act (2204) which included congressionally designated corridors that were not included in the plan amendment or the corridor map. The corridor map (Figure 2-10) was also modified to reflect the corridors tied to this Act.
- Action LR-LUA 21 from the Proposed Plan was deleted because the Federal Highway Administration and the Nevada Department of Transportation already have valid existing rights associated with their easements and ROWs, and this planning effort would not change the terms and conditions of their existing easements or ROWs. Making this a Management Action is repetitive and unnecessary.

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Travel and Transportation

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- Due to confusion that was outlined in protest letters and in the Governor's Consistency Review, MD TTM 2 was clarified that limiting off-highway travel to existing routes in PHMAs and GHMAs would be "subject to valid existing rights, such as for a mine under a plan of operations".
- Additional language was added to MD TTM 3 to make it clear that the bulleted "guidelines will be considered when undertaking future implementation-level travel planning". This was in response to protest misunderstandings. In addition, bullet three was amended by deleting "developed in this plan amendment", as the criteria is not developed through the plan amendment.

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Mitigation

- In order to provide consistency across the Great Basin Regional Planning area, the two Mitigation management decisions were removed from the Adaptive Management, Monitoring, and Mitigation section of Chapter 2 in the Proposed LUPA (which are now separate Appendices) and inserted as management decisions independently under the Mitigation section.

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2.4.3 Oregon

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Lands and Realty

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- A typographical error in the socioeconomic analysis of the proposed RMPA was identified during the Protest period. Correction to this error in Section 4.20.3, page 4-345, is as follows: Paragraph beginning "Restrictions to ROW development under Alternatives B, C, D,E, F, and the Proposed Plan…" is replaced with: "Proposed management under Alternatives B, C, D, E, F, and the Proposed Plan could require investors to consider alternative power line ROW alignments or designs that could increase the costs of constructing new infrastructure. A 2012 WECC study, for example, provides information on transmission line construction costs per mile, which range from $927,000 to

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$2,967,000 depending on voltage and whether lines are single or double circuit lines. The same study provides cost multipliers for difficult terrains, reaching up to 2.25 in the case of forested lands (WECC 2012). Utilities and other infrastructure investors typically pass these costs on to consumers. Where the rate base is smaller, such as in rural areas, per-customer rate impacts associated with constructing a 10-mile, 230kV transmission line, for example, would be greater compared to the economic impacts on rate payers served by a larger metropolitan utility proposing the same line. Under Alternatives B, C, D, E, and the Proposed Plan, rate payers serviced by local utility providers with small rate bases would be impacted more by costs associated with added route lengths or infrastructure design requirements compared with rate payers serviced by larger, multi-state providers. Where technically and financially feasible, Alternatives B, D, and the Proposed Plan identify burial of power lines as a design option to mitigate impacts on GRSG. New construction costs of underground transmission lines can be between 4 and 14 times higher compared to new overhead construction (PSC 2011), depending on terrain. In rural areas, burial of new distribution lines would be more than double the cost of new overhead construction. Burying existing distribution lines would likely cost between $400,000 and $500,000 per mile in rural areas (EIA 2012). Under all alternatives, where burying new lines would be technically unfeasible or result in costs that could not be absorbed by the rate payers, infrastructure investors would explore other route or design options that avoid impacts to GRSG habitat."

Special Status Species (Greater Sage-Grouse)

- Objective SSS 6 was modified to clarify that the BLM will coordinate with the State of Oregon regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring related to adaptive management and anthropogenic disturbances. This modification was recommended by the Governor during the Governor's Consistency Review.

Leasable Mineral Resources

- Based on internal review, MLS 7 from the proposed RMPA, which is now MD MR 7 in the ARMPA, was modified to include all fluid mineral lease development, including geothermal permits to drill.

2.4.4 Utah

General Changes

- Throughout the Proposed RMP Amendment, the use of words like "would," "could," "should," and "may" were generally removed or revised to reflect the active management direction of an ARMPA rather than potential management presented when the Proposed RMP Amendment was one of many alternatives the agency could select.

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- Language was added to Objective SSS-3 (Objective GRSG-3 in the Proposed RMP Amendment), MA-SSS-4 (MA-GRSG-4 in the Proposed RMP Amendment), MA-SSS-6 (MA-GRSG-6 in the Proposed RMP Amendment), Objective VEG-1, MA-VEG-1, MA-FIRE-3 and MA-FIRE-4 to clarify that landscapes that include populations of both GRSG and Utah prairie dog (UPD), a federally listed species, be managed for the benefit of both species. This addition is included to ensure that this objective is applied to all applicable objectives and management actions, not just the five actions in the Proposed RMP Amendment where this concept and language was already present.
- Throughout the Proposed RMPA there were a number of references to coordinating with the State of Utah, Division of Wildlife Resources, or state biologists. These were all revised to note that such coordination would be with “the appropriate State of Utah agency.” This clarification was made at the request of the Governor during the Governor’s Consistency Review.
- The Proposed RMP Amendment introduced the term “biologically significant units” (BSU) for adaptive management and the disturbance cap to provide a consistent approach for managing and monitoring across the GRSG range. In the Utah Sub-Region, the BSU concept is the same as PHMA within population areas. As part of resolving protests, the ARMP was revised to note that “BSUs” are PHMA within population areas. Whenever the term BSU was used, it was replaced with the more descriptive text, with a parenthetical reference to BSUs for the purposes of coordinating across state lines.

Special Status Species (formerly Greater Sage-Grouse)

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- Objective GRSG-1 from the Proposed RMP Amendment, which is now Objective SSS-1 in the ARMPA, was changed to remove reference to WAFWA management zones when addressing designation of PHMA. This change was made during the Governor’s Consistency Review to more closely reflect the management in the State of Utah’s Conservation Plan for Greater Sage-Grouse in Utah (2013).

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- MA-GRSG-1 from the Proposed RMP Amendment, which is now MA-SSS-1 in the ARMPA was revised to include the following text: “The BLM will apply these goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate.” This is consistent with the planning criteria contained in the sixth bullet on page 1-20 of the Final EIS. This language was added based on an accepted recommendation made by the Governor during the Governor’s Consistency Review.
- The language of MA-GRSG-1 from the Proposed RMP Amendment, which is now MA-SSS-1 in the ARMPA, regarding non-habitat areas within PHMA and GHMA was revised to clarify the intent of the action. This revision was made as a result of internal reviews to ensure the text more accurately reflected the intent behind the management action.
- The introductory language of MA-GRSG-3 from the Proposed RMP Amendment, which is now MA-SSS-3 in the ARMPA, was revised to clarify the intent of the action. This revision was made as a result of internal reviews to ensure the text accurately reflects the

intent behind the management action and to focus on land uses that have been identified as threats to GRSG.

- The language of MA-GRSG-3e from the Proposed RMP Amendment, which is now MA-SSS-3e in the ARMPA, was revised to clarify the intent of the noise restrictions. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action to focus on land uses that have been identified as threats to GRSG. Further, language was added to identify when "ambient" noise levels would be assessed to avoid managing for continual, incremental increases in noise levels.
- The language of MA-GRSG-6 from the Proposed RMP Amendment, which is now MA-SSS-6 in the ARMPA, was revised to clarify the intent of GRSG management outside PHMA/GHMA. This revision was made as a result of internal reviews to ensure the text accurately reflects the intent behind the management action. The purpose of this action is to provide direction regarding management of areas outside PHMA/GHMA that have been treated to improve GRSG habitat. The change was necessary to avoid implication of changing allocations or altering PHMA/GHMA boundaries outside a planning process while minimizing conflicting land uses in areas where an investment in increasing GRSG habitat have been made.

Livestock Grazing

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- The language of MA-GRA-6 from the Proposed RMP Amendment, which is now MA-LG-6 in the ARMPA, was revised. The concepts and intent did not change, but the text was revised to align with similar concepts and intent that was present in the livestock grazing sections in GRSG amendments throughout the Great Basin.

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2.5 Protest Resolution

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BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed RMP/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four Great Basin Region PRMPAs/FEISs.

The Director concluded that the BLM followed all applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party has been notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.4.1. The BLM Director's decisions on the protests are summarized in each of the PRMPAs/FEISs Director's Protest Resolution Reports, which are available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

2.5.1 Idaho and Southwestern Montana

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For the Idaho and Southwestern Montana GRSG Proposed LUPA/Final EIS, the BLM Director received 20 timely protest submissions. All of the protesting parties had standing; however, one submission was dismissed as it did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

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- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- adaptive management,
- GRSG habitat objectives,
- livestock grazing,
- mitigation,
- compliance with APA,
- compliance with the Energy Policy Act of 2005,
- ACECs,
- fire and fuels management,
- fluid minerals,
- solid minerals,
- special status species,
- lands and realty, and
- travel and transportation management.

2.5.2 Nevada and Northeastern California

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For the Nevada and Northeastern California GRSG Proposed LUPA/Final EIS, the BLM Director received 40 timely protest submissions. All of the protesting parties had standing; however, two submissions were dismissed as they did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

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- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- adaptive management,
- GRSG habitat objectives,
- livestock grazing,
- mitigation,
- compliance with APA,
- compliance with the Energy Policy Act of 2005,
- Air Quality,
- Climate Change,

- Noise,
- ACECs,
- solid minerals,
- special status species,
- lands with wilderness characteristics,
- lands and realty,
- tribal issues,
- wild horse and burros, and
- travel and transportation management.

2.5.3 Oregon

For the Oregon GRSG Proposed LUPA/Final EIS, the BLM Director received 30 timely protest submissions. All of the protesting parties had standing; however, three submissions were dismissed as they did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- monitoring,
- ACECs,
- fire and fuels management,
- solid minerals,
- special status species, and
- travel and transportation management.

2.5.4 Utah

For the Utah GRSG Proposed LUPA/Final EIS, the BLM Director received 43 timely protest submissions. All of the protesting parties had standing; however, three submissions were dismissed as they did not contain any valid protest points pursuant to 43 CFR 1610.5-2. Valid protest issues addressed in the Director's Protest Resolution Report included:

- compliance with FLPMA,
- compliance with NEPA,
- compliance with ESA,
- density and disturbance,
- adaptive management,
- land use allocations,
- GRSG habitat objectives,
- livestock grazing,
- mitigation,

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- compliance with APA,
- compliance with the Energy Policy Act of 2005,
- air quality,
- climate change,
- noise,
- ACECs,
- fire and fuels management,
- fluid minerals,
- solid minerals,
- special status species,
- lands and realty,
- travel and transportation management, and
- reasonable foreseeable development scenarios.

2.6 Governor's Consistency Review

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The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and resource management plans also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement throughout the development of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal laws and regulations applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

The 60-day Governor's consistency review period ended on July 29, 2015. In the Great Basin Region, the Governors of Idaho, Nevada, Oregon, and Utah submitted letters to their respective BLM State Directors identifying inconsistencies between the BLM's proposed RMP amendments and their state's or local governments' resource-related plans, policies and/or procedures, as well as other concerns that they had with the proposed planning documents. The BLM State Directors notified the Governors as to whether their recommendations were accepted or rejected on August 6, 2015. These Governors were then provided with 30-days to appeal the BLM State Director's decisions to the BLM Director. By September 8, 2015, the BLM Director received appeals from.

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In some instances, modifications to the ARMPAs were addressed based on recommendations submitted to the BLM by the applicable Governors. These modifications to the ARMPAs were made and are summarized in Section 2.4.1.

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3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs in order to meet in the purpose and need of this effort to identify and incorporate appropriate management direction in LUPs to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. All management considered under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law there are typically few or no distinctions between alternatives.

3.1.1 Alternative A – No Action Alternative

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Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the FWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

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Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix C, Required Design Features (RDFs), of each of the attached ARMPAs.

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, this alternative did not provide adequate conservation in GHMA. .

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

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Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below) and included two sub-alternatives under Alternative C for a reduction in livestock grazing and wild horses and burros management.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required to conserve GRSG and its habitats. Alternative C was also not selected in its entirety because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

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Alternative D, which was identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocations are less stringent, but still aim to protect GRSG habitat (for example, applying moderate constraints and stipulations to fluid minerals in GHMA).

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

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Alternative E is the alternative based on information provided by the State or Governor's offices for inclusion and analysis in the EISs. In many instances, the BLM had to adjust what was provided by the States and Governors to fit BLM language, decision-making constructs, etc. This alternative incorporates guidance from specific state conservation strategies, if developed or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. This document describes the Oregon Department of Fish and Wildlife's proposed management of GRSG on Federal lands. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. In alternative E1 conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected in its entirety as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the alternative were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

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Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA. While the Utah Draft EIS did not include an Alternative F, it did create two sub-alternatives under Alternative C for livestock grazing and wild horses and burros to consider and analyze a similar reduction.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture.

3.1.7 – Proposed Plan Amendment

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As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focused on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

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3.1.8 Environmentally Preferable Alternative

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative B, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

3.2 Alternatives Considered But Not Analyzed in Detail

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The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

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For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- FWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

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Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

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Oregon

- FWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

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Utah

- FWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

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4. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

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BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department of the Interior policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed management.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date. For more plan specific information related to the public involvement, consultation, and coordination processes that the BLM conducted, please refer to Chapter 3 of the attached ARMPAs.

4.1 Public Involvement

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The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on

December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Draft RMPAs/DEIS, Idaho and Southwestern Montana conducted seven public meetings, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMPAs/Draft EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plan Amendments. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft RMPAs/Draft EISs' comment periods. Comments on the Draft RMPAs/Draft EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMPAs.

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A Notice of Availability (NOA) for all of the Great Basin Region GRSG Proposed RMPAs and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governor'' consistency review. Refer to **Section 2.5 and 2.6** for a full description of the protest period and governor's consistency review outcomes.

4.2 Cooperating Agencies

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A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

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The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the FWS and the U.S. Forest Service. In addition, the Great Basin sub-regions also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 13 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs. These cooperating agencies divided by sub-region are provided below:

Great Basin Region-Wide
US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana
Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California
Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County

Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon
Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah
Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emery County
Garfield County
Grand County
Iron County
Kane County
Lincoln County (WY)

Millard County
Rich County
Sanete County
Sevier County
State of Utah (PLPCO)
State of Wyoming
Sweetwater County (WY)
Sweetwater County Conservation District (WY)
Tooele County
Uinta County (WY)
Uintah County (UT)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

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4.3 FWS Section 7 Consultation

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Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the FWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the FWS for review. The USFWS evaluated the biological assessments and concurred with the either a "no affect" or "may effect, but will not adversely affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the Utah Prairie Dog, a threatened species under the ESA. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix K).

4.4 Native American and State Historic Preservation Office Consultation

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~~In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in~~In recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation ~~efforts related to~~in preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent 65 individual letters to tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts, and in some cases, as Cooperating Agencies.

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~~In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.~~

As part of the NEPA scoping and consultation process, ~~and as an opportunity to provide comment pursuant to Section 106 of the NHPA~~, the BLM notified ~~and/or invited~~ the Idaho, Montana, Nevada, California, and Oregon State Historic Preservation Officers (SHPOs) ~~seeking information regarding concerns with~~ of the opportunities to comment on the planning and NEPA documents prepared for these efforts, as they relate to historic properties in the planning areas and the land use ~~planning direction~~plan decisions included in ~~these~~the ARMPAs~~, to participate in the planning process~~. The BLM sought information about historic properties in consideration of land use planning decisions ~~included in these ARMPAs~~ in accordance with the National Programmatic Agreement (PA) between the BLM, Advisory Council on Historic Preservation, ~~and~~ National Conference of State Historic Preservation Officers, and the Idaho, Montana, and Oregon State Protocol Agreement between the BLM and these SHPOs. ~~The~~If the BLM ~~incorporated the~~ received comments and information ~~it received~~ from SHPOs and Tribes~~-~~, that information was considered and incorporated into the Proposed RMPAs~~ and considered such information in making~~/Final EISs and the ~~land use plan amendment decisions~~ARMPAs. The BLM has met its obligations under Section 106 of the NHPA, 54 U.S.C. § 306108, as outlined in the National PA and the State Protocols. The BLM will satisfy the requirements of NHPA Section 106 for future implementation-level decisions, such as project proposals, including adequate consultation with SHPOs, THPOs, Native American Tribes, and other interested parties, consistent with the alternative procedures set forth in the National PA and relevant State Protocol or where applicable the Section 106 regulations.

For the Utah ARMPA, the BLM completed consultation with the Utah SHPO in accordance with the 36 CFR Part 800. In July 2015, the BLM submitted a formal letter, concluding that the land use plan amendments would not adversely affect cultural properties and seeking input and concurrence on those findings and received a concurrence letter from the Utah SHPO on July 30, 2015. The BLM will satisfy the requirements of NHPA Section 106 for future implementation-level decisions, such as project proposals, including adequate consultation with SHPOs, Tribal Historic Preservation Officers (THPOs), Native American Tribes, and other interested parties, consistent with the alternative procedures set forth in the National PA and relevant State Protocol, programmatic agreements, or where applicable the Section 106 regulations.

5. REFERENCES

6. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. Notices of the public availability of the Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published in the Federal Register on May 29, 2015. in the (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of the Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

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Comment [17]: EMPSi will develop.

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I hereby approve the land use plan amendment decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Janice Schneider Assistant Secretary for Land and Minerals Management Department of the Interior	Date

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7. ATTACHMENTS

Attachement 1. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Attachement 2. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Attachement 3. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Attachement 4. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

Internal Draft Document – Do Not Distribute

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana; Nevada and Northeastern California; Oregon; and Utah

Prepared by:

U.S. Department of Interior
Bureau of Land Management
Washington, DC

September 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Comment [JRL1]: NTS – where does this come from?
Kk: This is BLM's mission statement. I don't know when it was originally developed, but we use it regularly in our materials & on our web pages

Cooperating Agencies

Great Basin Region-Wide
US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana
Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California
Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon
Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah
Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emory County
Garfield County
Grand County
Iron County
Kane County
Lincoln County
Miller County
Piute County
Rich County
San Pete County
Sevier County
State of Utah (PLPCO)
Sweetwater County
Sweetwater County Conservation District
Tooele County
Uinta County (UT and WY)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

[Insert BLM WO Letterhead]

In Reply Refer To:
In Reply, Refer to:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). The ROD approves the four Great Basin Region ARMPAs, which are part of seventeen other sub-regional RMP Amendments and RMP revisions associated with the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011.

The Bureau of Land Management (BLM) ARMPAs provide a ~~range wide~~ landscape-level, ~~comprehensive~~, science-based, collaborative strategy for addressing previously identified threats to the greater sage-grouse (GRSG) and its habitat. This strategy, while designed to address issues leading to the U.S. Fish and Wildlife Service's (FWS) 2010 "warranted but precluded" decision, was guided by over a decade of research, analysis and recommendations for GRSG conservation produced by the Conservation Objectives Team (COT) Report and the BLM National Technical Team and (NTT). Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and other partners were fundamental during the development of ~~the land use plan decisions within~~ these ARMPAs to address the identified threats to GRSG.

It is important to note that this ROD and these ARMPAs are specific only to BLM-administered lands. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy Management Act (FLPMA) requires the development and maintenance, and, as appropriate, the revision of land use plans for public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions that could significantly affect the environment. In fulfillment of these requirements, the Draft

Comment [JRL2]: NEED TO CLARIFY WHAT THIS IS AND WHAT TRIGGERED THE "START" OF THE STRATEGY – not referenced in the ROD precisely as "start" of strategy.

Comment [JRL3]: NOT RANGEWIDE, SINCE BLM PLANS DON'T COVER THE ENTIRE RANGE. THEY ARE "LANDSCAPE-LEVEL".

Comment [JRL4]: NOT COMPREHENSIVE SINCE OTHER ACTIVITIES – E.G., IMPLEMENTATION OF THE RANGELAND FIRE STRATEGY IS ALSO A PART OF A "COMPREHENSIVE" STRATEGY – AND NOT PART OF THE DECISIONS COVERED IN THE ARMPAs.

Comment [GSD5]: FWS does not capitalize and neither does the Dept in our materials . . .

Comment [MEM6]: Caps is consistent with other BLM planning docs and our tech. guide. May need to discuss.

Comment [KK7]: Culminating in? – COT & NTT didn't really produce the decade of research, and analysis; or ". . . guided by over a decade of research for GRSG conservation and analysis and recommendations provided by the COT . . ."

Comment [JRL8]: Shouldn't this be "hyphenated" every time?
KK: contractor will take care of editorial items

RMP Amendments/Draft EISs incorporating analysis and input provided by the public; local, State, and other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM personnel were published in the fall of 2013. The 90-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 letters that were submitted. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

Comment [JRL9]: For all plans or just those in this subregion?
KK: just this subregion

The Proposed RMPAs/Final EISs were made available on May 29, 2015, for a 60-day governor's consistency review and 30-day protest period. The BLM received consistency review letters from X and has worked closely with these states to resolve these inconsistencies. X protest letters were received, of which X were valid protests in need of resolution. Protest issues are addressed and resolved in the Protest Summary Report, available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

After much consideration, the BLM now approves the attached ARMPAs as the land use planning documents that will guide greater sage-grouse habitat management and uses that may affect the GRSG and its habitat in the Great Basin Region for the life of the plan amendment for the benefit of GRSG and over 350 other species of wildlife as well as many other land uses, like grazing and recreation, that depend on ~~a~~ healthy sagebrush-steppe landscapes.

Comment [JRL10]: Actually, all land and resource management in the affected area – better to clarify?
KK: suggested edit

Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, Cooperating Agencies; local, State, and other Federal agencies; and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented and monitored for the conservation of Greater sage-grouse and their habitat.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This Record of Decision (ROD) is the culmination of an unprecedented effort in public land management to meet the multiple-use and sustained-yield management objectives for public lands administered by the Bureau of Land Management (BLM) in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA).

In response to a 2010 determination by the U.S. Fish and Wildlife Service (FWS) that the greater sage-grouse listing under the Endangered Species Act (ESA) is "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service), has developed a targeted, multi-tiered, landscape-level management approach, based on the best available science, that offers the highest level of protection for Greater Sage-Grouse (GRSG) in the most important habitat areas to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team (COT) report.

This Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon; and Utah includes land use allocations in the ARMPAs that limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs implement a suite of management actions, such as the establishment of disturbance limits, GRSG habitat objectives, mitigation requirements, monitoring protocols, and adaptive management triggers and responses, as well as other conservation measures throughout the range. The cumulative effect of these conservation measures work in concert to protect, improve, and restore GRSG habitat across the remaining range of the species in the Great Basin and provide greater certainty that BLM land and resource management activities in GRSG habitat in the Great

Basin Region can lead to conservation of the GRSG and other sagebrush-steppe associated species in the region.

The targeted land use plan protections presented in this ROD and ARMPAs do not only protect the greater sage-grouse and their habitat, but also the over 350 wildlife species that call the sagebrush-steppe ecosystem home. Reversing the slow degradation of this valuable ecosystem will also benefit local rural economies and a variety of rangeland uses in addition to habitat protection, ~~ranging from~~ including recreation and ~~to~~ grazing ~~and energy development~~, in a manner that safeguards the long term sustainability, diversity and productivity of the land.

This conservation strategy, developed in collaboration with the 11 states in which the ARMPAs and ARMPs apply, in addition to other state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna, in order to "conserve the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT report. 2014]

Comment [GSD11]: We may want to add some language at the end here from the rollout materials about targeted protections that benefit GRSG, 350+ other species as well as economic activity that depends on a healthy range.

Comment [MEM12]: Added this last paragraph based on Sarah G's suggestion. Will this work or should we flesh out more?

Table of Contents

Dear Reader Letter

Summary

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM-~~-~~administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.), BLM planning regulations (43 Code of Federal Regulations [CFR] §1601 *et seq*.), and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA) and the Council on Environmental Quality's Regulations for implementing the procedural provisions of NEPA (40 CFR §1500.1 *et seq*.).

Comment [JRL13]: Hyphen?

Throughout the GRSG planning process, the ~~U.S.~~ Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The ~~U.S.~~ Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Comment [JRL14]: Cited previously, so should reference consistently through here on out.

1.1 Great Basin Region Planning Area

The Great Basin Region is composed of four sub-regions, the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure 1-1** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) documents were prepared for each of these sub-regions. Each sub-region conducted its own planning effort with input from local cooperators, stakeholders, and members of the public. The sub-regional boundaries were constructed to align with BLM administrative offices, state boundaries, as well as areas that shared common threats to the GRSG and their habitat. The boundaries for these sub-regions largely coincide with zones III, IV, and V identified by the WAFWA Greater Sage-Grouse Conservation Strategy to delineate management zones with ~~similarecological~~similar ecological and biological issues and similarities.

Comment [KK15]: We could add the WAFWA zones here as one additional element used to make the region/subregion boundaries??

[Insert **Figure 1-1** - Great Basin Region Greater Sage-Grouse Sub-regions]

The Great Basin Region planning area boundaries include all lands regardless of jurisdiction (see **Figure 1-2** - Great Basin Region Planning Area, Greater Sage-Grouse Habitat Management Areas). **Table 1-1** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.

[Insert **Figure 1-2** - Great Basin Region Planning Area, Greater Sage-Grouse Habitat Management Areas]

Table 1-1
Land Management in the Great Basin Planning Area

Surface Land Management	NV/NE CA	ID/SW MT	Utah	Oregon	Great Basin Total
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,975,500**
USFWS	805,900	121,900	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,200**	**48,209,900**	**31,656,300**	**194,208,300**

Source: BLM GIS 2015

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure 1-3** - Great Basin Region Decision Area , Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

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Comment [JRL16]: HOW DO THESE DECISIONS DIFFER FROM OTHER LAND USE DECISIONS?
KK: should this sentence be deleted? It just seems to open the door to a debate about whether every decision in the plan really is necessary for conservation. And obviously, since this amendment is for GRSG conservation, all decisions are pertinent to that.

[Insert **Figure 1-3** - Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas]

1.2 Threats to Greater Sage-Grouse

Currently, GRSG occupy an area that has been estimated to be a reduction of 44% from the historically occupied range. In addition, populations in most or all the range have been demonstrated to have declined from 1965- 2003, the period where data was collected most intensively.

The decline of the GRSG and its sagebrush-steppe habitat has been the focus of fish and wildlife agency and conservationists' concerns for decades. In 1994 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of GRSG. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of GRSG population losses and degradation of sagebrush ecosystems in order to: 1) Maintain the present distribution of GRSG and 2) Maintain the present abundance of GRSG. In 1999 WAFWA amended the objectives to: 1) Maintain and increase where possible the present distribution of GRSG and 2) Maintain and increase where possible the present abundance of GRSG. The Bureau of Land Management, USFWS, and U.S. Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000.

Between May 1999 and December 2003, eight petitions were filed with the U.S. Fish and Wildlife Service (USFWS) to have sage-grouse protected under provisions of the Endangered Species Act (ESA). In 2001 the USFWS determined that greater sage-grouse in the Columbia Basin of Washington state warranted protection under provisions of the ESA. On January 12, 2005, the FWS issued a decision that listing the GRSG for protection under the ESA was not warranted. However, in response to July 14, 2006 Western Watersheds Project filing alleging that the FWS 2005 finding was incorrect and arbitrary, the U.S. District Court of Idaho ruled that the 2005 finding was "arbitrary and capricious" and remanded it to the FWS for further consideration. Ultimately, as a result, in 2010 the FWS issued a finding that listing of the Greater sage-grouse was "warranted but precluded". Subsequent to that finding ~~and in accordance with a settlement agreement,~~[details?] the FWS committed to make a final determination regarding the need to list the GRSG by September 30, 2015. Two factors led to the FWS decision to list the species as "warranted but precluded": threats to habitat and the inadequacy of existing regulatory mechanisms.

Comment [JRL17]: Need to address.

Comment [KK18]: I suggest we just delete it – don't think this is necessary for the BLM ROD

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The USFWS has identified a number of threats to GRSG in the Great Basin Region, focusing on the present and widespread threats of wildfire and the loss of native habitat to invasive species. Other threats, some of which are more localized by nature, include habitat fragmentation due to anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization and sagebrush elimination, as well as disturbance associated with free-roaming equids and improper livestock grazing.

Additional information regarding potential threats to the GRSG is contained in the BLM National Technical Team (NTT) report and the Conservation Objectives Team (COT) reports. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as articulated in the COT report – is summarized in **Table 1-2**.

In addition, the FWS found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM, which manages more than 40 percent of the remaining habitat range wide, regulatory mechanisms are the agency's Resource Management Plans (RMPs).

Comment [JRL19]: DO WE NEED TO FOOTNOTE SINCE WE USE "RANGE" AS THE BASE HERE AND A DIFFERENT CHARACTERIZATION/REFERENCE IN OTHER PARTS OF THE DOCUMENT?

The BLM initiated this planning effort with the U.S. Forest Service to provide the needed federal regulatory mechanisms to address the individual threats listed in Table 1-3. This ROD approves the BLM's attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPAs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM- administered lands. ~~The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).~~

Comment [KK20]: I'm inclined to delete this as unneeded here

Comment [KK21]: Already in the 1st paragraph of the intro

Table 1-2. Threats to GRSG in the Great Basin Region (Utah) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan**
Rich-Morgan-Summit (UT)	9b				Y	Y	Y	Y		Y			Y	Y	Utah
Uintah (UT)	9c				Y	Y	Y	L	Y	Y			Y	Y	Utah
Strawberry Valley (UT)	10a	Y			Y	Y	Y	Y		Y			Y		Utah
Carbon (UT)	10b	Y			Y		Y	Y	Y	Y			Y		Utah
Sheeprock Mountains (UT)	11	Y			Y	L	L	Y	Y	L		Y	L		Utah
Emery (UT)	12	Y			Y	Y	Y	Y	Y	Y			Y		Utah
Greater Parker Mountain (UT)	13a				Y	Y	Y			Y			Y		Utah
Panguitch (UT)	13b			Y	Y	Y	Y	Y	L	Y			Y	L	Utah
Bald Hills (UT)	13c	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Utah
Ibapah (UT)	15a	Y			Y	Y	Y	Y	Y	Y		Y	Y		Utah
Hamlin Valley (UT)	15b	Y			Y	Y	Y			Y		Y	Y		Utah
Box Elder (UT)	26b			Y	Y	Y	Y	L	Y	Y			Y		Utah

Table 1-2. (cont.) Threats to GRSG in the Great Basin Region (OR, CA, NV, ID, SWMT) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	Unit Number	Isolated Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifers	Weeds/Annual Grasses	Energy	Mining	Infrastructure	Grazing	Free-Roaming Equids	Recreation	Urbanization	EIS/Plan(s)
N. Great Basin (OR, ID, NV)	26a		L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	ID/SW MT, OR, NV/CA
Baker (OR)	17	Y	Y	Y	Y	L	Y	L	Y	L	U		L	L	OR
Central Oregon (OR)	28		L	L	Y	Y	Y	L	Y	L	Y	U	L	L	OR
W. Great Basin (OR, CA, NV)	31		L	L	Y	Y	Y	L	L	L	Y	Y	U		OR, NV/CA
Klamath (CA)	29	Y	U	U	Y	Y	Y	L		U	U	U	U	U	NV/CA
Northwest Interior (NV)	14	Y			Y		Y	U	Y	Y	Y	Y	Y		NV/CA
Southern Great Basin (NV)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y		NV/CA
Quinn Canyon Range (NV)	16	Y			Y	Y	Y			Y	Y	Y	Y		NV/CA
Warm Springs Valley (NV)	30	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	NV/CA
East Central (ID)	18	Y	L	Y	L	Y	L	Y		Y	Y		L		ID/SW MT
Snake-Salmon-Beaverhead (ID)	23		L	L	Y	L	Y	Y		L	Y	Y	L		ID/SW MT
Weiser (ID)	25	Y	L	L	L	L	Y	Y		L	Y		L	L	ID/SW MT
Sawtooth (ID)	27	Y	L		L	U	L			Y	Y		L		ID/SW MT
Southwest Montana (MT)	19-22		L		L	L	Y	L	L	L	Y		L	L	ID/SW MT

1.3 Early GRSG Conservation

The BLM manages the majority of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State Distinct Population Segments). Efforts to conserve the habitat of this species by the BLM and other wildlife conservation agencies and organizations ~~did not begin with the 2011 BLM's National GRSG Planning Strategy, but rather,~~ have been ongoing for many years.

The Western Association of Fish and Wildlife Agencies (WAFWA) 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, contributed to by the BLM, was to present an unbiased and scientific documentation of dominant issues and their effects on GRSG populations and sagebrush habitats.
http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the U.S. Fish and Wildlife Service (FWS), the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG.
http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation as well as summarizing BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States and Canada.
http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, BLM commissioned an effort to map breeding densities of GRSG across the West. A conference was convened with the state wildlife agencies to get approval and to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active leks across the West. This model served as a standard starting point for all states to identify priority habitat.

http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published their 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM and Forest Service as conservation measures in land use plans.

1.4 National Greater Sage Grouse Planning Strategy

Based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a listing decision on this species, the BLM recognized the need to incorporate explicit objectives and adequate conservation measures into RMPs by 2015 to conserve GRSG habitat and avoid the need to list the species under the Endangered Species Act. In August, 2011, the BLM chartered a planning strategy to evaluate the adequacy of BLM RMPs and address revisions and amendments throughout the range of the GRSG (with the exception of the bi-state population in California and Nevada, and the Washington state distinct population segment, which were addressed through other planning efforts). This Charter established the teams, team membership, and team operating procedures for the BLM's National GRSG Planning Strategy. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms through RMPs to conserve and restore the GRSG and its habitat on BLM-administered lands on a range-wide basis for the long-term (Figure C).
http://www.blm.gov/style/medialib/blm/wo/Communications_Directorate/public_affairs/sage-grouse_planning/documents.Par.2415.File.dat/Final%20Signed%20GSG%20Planning%20Strategy%20Charter.pdf

Two national teams and numerous other studies were used to help inform the planning efforts. The GRSG National Technical Team (NTT), comprised of BLM, FWS, USGS, NRCS, and State specialists, completed A Report on National Greater Sage-Grouse Conservation Measures in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats in the FWS listing action (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones (Figure 1-4). The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and

emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. ~~These WAFWA Management Zones are identified on **Figure 1-4** below.~~ http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

In 2012, FWS convened the Conservation Objectives Team (COT) of state and federal representatives to produce a peer-reviewed report which identified the principal threats to GRSG survival -- based upon the FWS 2010 listing decision -- and the degree to which these threats need to be reduced or ameliorated to conserve the GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future.[1] The COT report also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". Finally, the COT report identified present and widespread, as well as localized threats by GRSG population across the West. These population specific threats, as specified from the COT report, are outlined in **Table 1-2**. **Figure 1-4** from the COT Report identifies the PACs, GRSG populations (and their names), and WAFWA Management Zones across the West. http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

[Insert **Figure 1-4** - GRSG Priority Areas for Conservation, Populations (and names), and WAFWA Management Zones.]

Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the ARMPAs.

To adequately address the reasons for the 2010 "warranted" determination by the FWS – and specific threats summarized in the COT report -- it was clear to the BLM that additional regulatory measures on federal public lands would be necessary to deal with present or threatened destruction, modification, or curtailment of habitat or range. These measures would need to be incorporated into land use plans that guide management actions on lands within the remaining range of the GRSG administered by the agencies to conserve GRSG such that listing under the ESA was no longer necessary.

In December 2011, the BLM published a Notice of Intent to prepare EISs and Supplemental EISs to incorporate GRSG Conservation Measures into Land Use Plans (LUPs) across the range of the species. A total of 15 sub-regional planning efforts (resulting in eight ARMPAs and nine ARMPs) would amend or revise 78 BLM RMPs ~~and 20 Forest LRMPs~~ across the range of the species.

The federal public land planning strategy reflected several key concepts:

- **Landscape-level**: The planning effort focused on the remaining habitat of the GRSG on public lands, covering 10 western states in the Great Basin and Rocky Mountain regions.
- **Best Available Science** – The ARMPAs/ARMPs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat and the NTT report, prepared by the BLM, provided options for dealing with the most significant threats to the GRSG. A series of reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the Western Association of Fish and Wildlife Agencies also provided crucial guidance in formulating the conservation strategy.

Comment [KK22]: In this section we go back to talking about the whole planning area, not just the ARMPAs for Great Basin. Is this necessary? If it is, is it clear to the average reader that we have made that transition & what the difference is between ARMPA and ARMP?

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[1] The Conservation Objectives Team (COT) report was prepared with the encouragement of the members of the Sage Grouse Task Force, chaired by former Secretary of the Interior Ken Salazar and Governor Meade of Wyoming and Governor Hickenlooper of Colorado.

- **Targeted, Multi-Tiered Approach** – The ARMPAs/ARMPs were designed to incorporate a layered management approach to avoid or minimize additional surface disturbance in the most valuable habitat, known as Priority Habitat Management Areas (PHMA), which are largely consistent with PACs identified in the COT Report. Within PHMA, the ARMPAs/ARMPs provide an added level of protection to limit or eliminate new surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. In General Habitat Management Areas (GHMA), the ARMPAs/ARMPs seek to minimize disturbance while providing greater flexibility for land use activities.
- **Coordinated**: The BLM ARMPAs/ARMPs were developed through a joint planning process led by the BLM with the Forest Service as partners. The USFWS provided guidance and input throughout the process to aid land managers in understanding the threats and the certainty and effectiveness of proposed land management actions in addressing those threats. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative**: The ARMPAs/ARMPs reflected the input of states and local stakeholders from the outset and were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Western Governors Association Sage Grouse Task Force (SGTF), which is discussed below, was particularly useful in facilitating this kind of collaborative input. The ~~proposed LUPs~~ ARMPAs/ARMPs reflect state and stakeholder developed approaches and economic priorities where consistent with conservation objectives.

Most states across the range provided recommendations for the management of the BLM lands in their state to conserve GRSG. In all cases, this input was incorporated into the range of alternatives analyzed in the Final EISs. Components of these state recommendations were used to develop the ARMPAs/ARMPs where consistent with conservation objectives.

In addition, the ~~Western Governors Association Sage Grouse Task Force~~SGTF was established in 2011 to identify and recommend state and federal conservation actions necessary to preclude the need for the GRSG to be listed under the ESA. This group, which includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, US Forest Service, US Geological Survey, and the Department of the Interior, played an integral role throughout this land use planning process.

1.5 Addressing Threats to the Greater Sage-Grouse through the ARMPAs~~ s~~

The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to "maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations".[2] The NTT report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed"[3] And, in establishing the COT, with the backing of the SGTF, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006

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[2] WAFWA 2006 Strategy. The 2006 objectives built on an initial framework and commitment made by the WAFWA directors, the BLM and the FWS in 2000 with the signing of an interagency sagebrush/sage-grouse conservation MOU.

[3] Sage-grouse National Technical Team. "A Report on National Greater Sage-Grouse Conservation Measures". December 21, 2011.

WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following,

> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."7

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

The ARMPAs/ARMPs were developed to remove or reduce identified threats to the species and are an essential component of the effort to conserve GRSG and avoid a listing of the species under ESA. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain updated land use plan direction on approximately 50 percent of the remaining habitat for the species. These ARMPAs/ARMPs are the product of extensive coordination between the BLM and the Forest Service and the active engagement of the USFWS in helping to inform land allocation and related management decisions by the BLM. The plans also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, and circumstances in each.

~~Designation of~~ Habitat Management Areas

In order to protect the most important GRSG habitat areas, the conservation strategy began with mapping areas of important habitat across the remaining range of the GRSG and within each state. In collaboration with state fish and wildlife agencies, the BLM identified areas as preliminary priority habitat ~~(PPH)~~ and preliminary general habitat ~~(PGH)~~. Maps were revised and refined as further mapping was conducted and state fish and wildlife agencies – often in collaboration with GRSG experts and researchers – provided more detailed analysis of habitat characteristics and populations. The ARMPAs reflect this input and have generally aligned these habitats with Habitat Management Areas in the ARMPAs. GRSG habitat management areas on BLM-administered lands in the decision area consist of lands allocated as Priority Habitat Management Areas (PHMA) which largely coincide with Priority Areas for Conservation in the COT report, General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table 1-4** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having the highest value for~~to~~ maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.

Comment [JRL23]: Need to check footnotes – these do not run in order in present draft

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Comment [KK24]: Why is SGTF 11 if this is 10 – Washington state is included?

Comment [JRL25]: I DON'T LIKE THIS NUMBER. WE HAVE BEEN SAYING WE MANAGED NEARLY 60% OF THE REMAINING HABITAT FOR SOME TIME. WE SHOULD NOT BE CHANGING THE NUMBERS NOW UNLESS OR ORIGINAL ANALYSIS WAS WRONG!

KK: we did change to 50% in the landscape report, so this is consistent with that. Did we use something like this in the FEISs?

Comment [MEM26]: Let me know if you think I need to integrate this into this section better. I think it flows ok now.

Comment [JRL27]: THIS SECTION DEALS WITH MORE THAN "DESIGNATION" SO I SUGGEST THE MODIFICATION NOTED.

- **GHMA**— BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft RMP/EIS.
- **OHMA** —BLM-administered lands ~~only~~ in Nevada, identified as unmapped habitat in the Proposed RMP/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.
- **IHMA** —BLM-administered lands in Idaho that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. ~~There are no IHMAs designated within southwestern Montana.~~ The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

Table 1-4
Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

The ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs (see **Figure 1-3** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). Across the Great Basin Region, there are 9,076,948 acres of BLM administered SFAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memorandum from the FWS Director to BLM Director and Forest Service Chief in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection". (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf)

This tiered habitat framework provides for a nested or layered conservation design with the goal of providing the greatest ~~protections~~ protections for habitat in PHMAs achieved through: ~~and~~ ~~(1)~~ the strongest limits ~~ed~~on- new surface disturbance – ~~achieved through~~such as (1) no surface occupancy with limited exceptions for fluid minerals development, (2) exclusions (with limited exception) for wind and solar development, (3) avoidance for new rights of way, (4) closures for saleable mineral, with limited exceptions, (5) -priority protection from rangeland fire~~, (6) priority for habitat~~

~~restoration.~~, (7) accelerated efforts to reduce grazing impacts from free-ranging equids, and (7) priority review for compliance with cattle grazing standards for public land allotments, as well as priority for habitat restoration.~~ in SFAs,~~

These conservation prescriptions for the PHMAs provide a high degree of certainty that the integrity of PHMAs can be maintained through management decisions to avoid or minimize additional surface disturbance. In SFAs, maximize protection from new surface disturbance would be achieved by (1) requiring NSO without exceptions for fluid minerals, (2) additional limits on disturbance from mining and related activity by recommending~~-~~ withdrawal from new hardrock mining claims~~,~~for areas of PHMA not already closed to hardrock mining, ~~and a commitment to reduce wild horse and burro populations to Appropriate Management Levels (AML) by 2020~~. Given the “existing high quality sage brush habitat for sage grouse … and highest breeding densities of sage grouse” in the SFAs, or strongholds, as identified by the FWS, the decision to recommend withdrawal of SFAs from future hard rock mining is consistent with the COT recommendation to “Avoid new mining activities and/or any associated facilities within occupied habitats, including seasonal habitats; and avoid leasing in sage-grouse habitats until other suitable habitats can be restored to habitats used by sage-grouse.”

~~p~~

Protection of remaining habitats in GHMAs would be managed consistent with the COT report recommendation ~~-~~to recognize “that important habitats outside of PACs be conserved to the extent possible”. ~~,~~Thus, land allocations and management prescriptions for lands in GHMAs provide for ~~with~~ more flexibility for land use activities that would be designed to minimize impacts on existing GRSG leks. In all GRSG habitat management areas, anthropogenic surface disturbing activities would be mitigated, and degraded landscapes, due to fire or other causes, would be actively restored and protected. ~~with a priority on SFAs, then PHMAs, and then GHMAs.~~ The combination of habitat classifications and land allocation decisions in the ARMPAs will provide the greatest protection for those areas identified as SFAs and meet the stated objective for these areas “where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species.”

Major components of the attached ARMPAs ~~developed to~~that address the specific threats to the viability of the GRSG, as identified in the USFWS 2010 listing decision and COT r~~R~~eport (many of which were also identified by the BLM’s NTT Report) are listed in **Table 1-3** and summarized below. Throughout the ARMPAs, a particular focus is placed on an “avoidance first strategy” as emphasized in the COT report by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is accomplished through identification and allocation of important GRSG habitat and excluding or avoiding surface disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which although more difficult and requiring a longer time frame, is important to the long-term viability of GRSG. Restoration decisions include specific habitat objectives, and a priority on treating GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* which provide a framework, specific actions, and Department-wide priority on managing Federal lands, particularly in the Great Basin, to protect and restore sagebrush-steppe habitat.

Comment [KK28]: Moved this down because the rest are surface disturbance, this is not.

Comment [KK29]: This new text is covered in the sections below about surface protection & habitat improvement – this section was supposed to be just about the designations, to provide context for the next sections. By moving it all up here, should we delete all following sections?

Comment [JRL30]: Correctly characterized?

Comment [KK31]: This is not an RMP thing so should not be included.

Comment [KK32]: I recommend moving all of this down to the surface disturbance section

Comment [KK33]: ?? is this correct

Comment [KK34]: Just to confirm, IHMA & OHMA are never part of this hierarchy?

Comment [KK35]: JL has deleted this, not sure why because it seems pertinent to explain the hierarchy.

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development.	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) • PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)
Energy development—fluid minerals, including geothermal resources	• PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. In Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for authorization if certain criteria is met. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	development)
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals)
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. • Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.
Recreation	• PHMA: Do not construct new recreation facilities unless required for health and safety purposes.

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	• Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. • PHMA & GHMA: OHV use limited to existing routes (routes to be designated through future travel management planning)
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	• GRSG habitat will be retained in federal management.

Comment [KK36]: Matt, I am pointing out that I added this to the table – it was in redline in the last version from me & Jim, but since I moved the table I think the whole table was redline so I just want to be sure you see it.

The ARMPAs were developed based on three range-wide objectives for conserving and protecting habitat: minimizing new and additional surface disturbances, improving habitat conditions, and reducing threats of rangeland fire to GRSG and sagebrush habitat. How the ARMPAs met these objectives is summarized below.

1.5.1 Avoid and Minimize Surface Disturbance

Allocations and Habitat Protection/Surface Disturbance Measures

Comment [KK37]: Are these subheaders needed or can we just let this section flow from paragraph to paragraph?

To avoid or minimize further surface disturbance in PHMAs the ARMPAs either close, exclude, or avoid major new surface disturbing activities. In SFAs, in addition to PHMA decisions described below and shown in **Table 1-3**, ARMPAs apply a no surface occupancy stipulation with no exceptions for oil and gas leasing and recommend these areas for withdrawal from future locatable mineral entry.

The four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA include, fo~~i~~r example, the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil and gas in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region.

Similarly, mineral development is closed in PHMAs for non-energy leasable minerals and saleable minerals, ~~with the exception of~~but not for locatable minerals governed under the 1872 Mining Act. An exception is granted for free use permits and the expansion of existing active pits for ~~mineral~~ saleable minerals ~~material sales~~ and expansion of existing non-energy leasable development. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

Comment [KK38]: I changed this so we used the same name as the previous sentence & Table 3.

Comment [GSD39]: What is the relevance of this statement, do we not have the coal language in the other plans?

Comment [MEM40]: Because energy development is a present and widespread threat to certain populations in UT, I thin k its important to state this. We can remove if needed.

In all PHMAs in the Great Basin Region, renewable energy development (solar and wind) is excluded, with the exception of three areas in southeastern Oregon where an avoidance allocation is applied; and new rights of way and development for transmission lines, pipelines, and related infrastructure is avoided through restrictions on land use authorizations. Where the allocation is avoidance, exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat.

Comment [GSD41]: Do we need to explain why OR is different here or somewhere else?

Comment [KK42]: Is this three areas or three counties?

Comment [MEM43]: This should be addressed in section 1.6. May need assistance with this rationale.

While restrictions on future development in PHMA are intended to avoid or minimize additional surface disturbance, restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation see **Table 1-3** for more details on GHMA management decisions. However, any disturbance is subject to mitigation and should seek to first avoid and then minimize any impacts to GRSG or its habitat, while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species. As noted in the COT report, "Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal , state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

In addition to areas where uses are closed, excluded or avoided, the ARMPAs direct the BLM to proactively prioritize oil and gas leasing and development outside of identified SFAs, PHMAs, and GHMAs in order to encourage new development in areas that would not conflict with GRSG and thus maximize the potential to limit disturbance to remaining GRSG habitat. This approach will also assist developers in reducing the time and cost associated with oil and gas leasing development by avoiding sensitive areas and decreasing the need for compensatory mitigation.

Comment [JRL44]: SHOULD WE CITE FINDINGS IN THE WEST STUDY HERE TO HIGHLIGHT HIGH AND MEDIUM OIL AND GAS POTENTIAL OUTSIDE OF HABITAT?

In general, all forms of new development would be closed, excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat, assuring that existing habitat would be protected and providing opportunities through compensatory mitigation to restore degraded habitats. This is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*, published by the FWS in September 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse." In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation gain for the GRSG.

In addition to major surface disturbing activities such as energy and infrastructure development, the ARMPAs address other identified threats~~activities~~, including improper livestock grazing, wild horses and burros overuse ~~management~~, and recreation. Grazing is the most widespread use of the sagebrush steppe ecosystem in the Great Basin Region. The COT r~~R~~eport recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage- grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the four Great Basin ARMPAs require the incorporation of GRSG seasonal habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritize the review and monitoring of grazing permits, and take numerous actions to avoid and minimize the impacts of range management structures (see **Table 1-3**).

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will focus on meeting and maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives, including completing rangeland health assessments, prioritizing gathers and population growth suppression techniques, and developing or amending Herd Management Area plans to incorporate GRSG habitat objectives and management considerations. In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.

Comment [KK45]: Don't think we can just say maintaining since most are currently over AML

Comment [JRL46]: Should we make note of commitment to bring all SFAs to AML by 2020?

Comment [MEM47]: The 2020 deadline is not mentioned as a management action in the ARMPAs. The language as presented is within all 4 ARMPAs.

To ameliorate the threat from recreational activities, new facilities or expansion of existing facilities (e.g., roads, trails, campgrounds) will not be authorized in PHMA unless the development results in a net conservation gain to GRSG its habitat. In PHMA and GHMA travel would be limited to vehicle routes. Initially, vehicles would be limited to existing routes until implementation travel management planning could be completed to designate routes. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning process.

Disturbance Caps, Density Caps, and Lek Buffers

In addition to the management actions and allocations discussed in detail in the sections above, the ARMPAs limit the amount of anthropogenic disturbances in PHMAs through the use of disturbance caps, density caps and lek buffers. These elements further address threats related to surface disturbances by limiting the amount of habitat impacted and keeping resource uses an appropriate distance~~way~~ from leks. In general, disturbance caps of 3% were established in accordance with the recommendations contained in the COT report. ~~i~~If the 3% anthropogenic disturbance is exceeded on lands (regardless of land ownership) within PHMA in any given Biologically Significant Unit (BSU), no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted within PHMAs in that Biologically Significant Unit. If the disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted until disturbance in the proposed project analysis area has been reduced to be under the cap (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.). The ARMPAs have a few modifications to the disturbance cap: Oregon does not allow more than 1% new anthropogenic disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, exceeding a 3% disturbance cap can occur at the BSU and/or the project level as long as the outcome results in a net conservation benefit as approved by the BLM in accordance with the process described in **Section 1.6**.

Comment [KK48]: Added a sentence to tie this section back to the threats it is addressing.

Comment [JRL49]: WHERE DO WE ADDRESS BSUs AND CALCULATION OF DISTURBANCE WITHIN BSUs? NEED TO DO SO WITH A PARAGRAPH OR REFERENCE TO A FOOTNOTE OR APPENDICE HERE.

~~Limiting Density of Disturbance~~

The ARMPAs incorporate a cap on the density of energy and mining facilities to encourage consolidation of structures and to reduce habitat fragmentation. The cap is set at an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT report. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located into an existing disturbed area, subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc. The one facility per 640 density decision does not apply to Nevada, as described in **Section 1.6**.

~~Buffering Development Impacts~~

The ARMPAs require that impacts to leks be evaluated for actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from certain activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The lek buffer distances required vary by type of disturbance (road, energy development, infrastructure, etc.) and are fully described in Appendix X of the ARMPAs.

The lek buffer distances will be applied as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) as defined in the ARMPAs. In PHMA, if the action cannot be located outside of the buffer-distance, the BLM may approve actions in PHMAs that are within the applicable lek buffer-distance only if a different buffer distance offers the same or greater level of protection to GRSG and its habitat. In GHMAs actions may be approved within the applicable lek buffer distance only if a different distance offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations) and any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain. This approach to determining relevant lek buffer distances is consistent with the COT recommendation that "conservation plans should be based on the best available science and use local data on threats and ecological conditions."[4]

Required Design Features

Required Design Features (RDFs) and Best Management Practices (BMPs) are required for certain activities in all GRSG habitat, including PHMA, GHMA, IHMA in Idaho and OHMA in Nevada. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). RDFs and BMPs have been developed for oil and gas

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[4] COT report. p 34

development, infrastructure, range developments, and other surface disturbing activities and are fully described in Appendix X of the ARMPAs.

1.5.2 Habitat Mitigation and Restoration, Monitoring and Adaptive Management~~Improving Habitat Conditions~~

In addition to ~~improving~~ prescribing land allocations and- managing~~ement of~~ resource uses ~~and~~ to minimize and avoid~~ing~~ further surface disturbance, the ARMPs/ARMPAs identify management actions to promote the ~~restoration and~~ mitigation and restoration ~~improvement~~ of GRSG habitat. ~~The ARMPAs also describe a~~ M~~m~~itigation for habitat disturbing resource uses will ~~program, which~~ follow~~s~~ the avoid, minimize, and compensate mitigation hierarchy. ~~(See **Section 5** for more information.)~~ Where compensatory mitigation is required to offset unavoidable impacts, habitat restoration activities will be developed ~~in coordination with the states,~~ to provide ~~for habitat restoration activities that produce~~ a net conservation gain for the GRSG.

During the implementation of the ARMPs/ARMPAs, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in GRSG habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation; ~~Wyoming will apply a net conservation gain standard to actions in PHMA only~~. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action. This standard is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0* published by the FWS in September, 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse"[5]**.** Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate) and be implemented on BLM-managed lands in a manner consistent with Departmental guidance for landscape mitigation pursuant to Secretarial Order 3330[6]. If impacts from BLM and Forest Service management actions and authorized third party actions result in habitat loss and degradation that remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.

Within 90 days of the issuance of the Record of Decisions, BLM will establish WAFWA Management Zone GRSG Conservation Team, including members from the respective states, Forest Service, USFWS, NRCS, and other local governments. This team that will develop a WAFWA Management Zone Regional Mitigation Strategy to inform the NEPA decision making process including the application of the mitigation hierarchy for BLM and Forest Service actions and third party authorizations that result in habitat loss and degradation. These regional mitigation strategies will contribute to GRSG habitat conservation by reducing, eliminating, or

Comment [MEM50]: Should we add a reference to adaptive management and monitoring?

Comment [KK51]: This section did not quite flow, so I reworked it a bit

Comment [KK52]: I think this reference should stay.

Comment [KK53]: Recommend moving down to mitigation section

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[5] USFWS. Greater Sage Grouse Range-Wide Mitigation Framework: Version 1.0. September 3, 2014.

[6] Secretarial Order 3330. Improving Mitigation Policies and Practices of the Department of the Interior. October 2013.

minimizing threats and compensating for residual impacts to GRSG and its habitat~~.~~, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to help guide the conservation of GRSG. The zonal mitigation strategy will be developed within one year of the issuance of the Record of Decisions.

Comment [JRL54]: CONFUSING – ONE TEAM DEVELOPS OVERALL STRATEGY THEN TEAMS DEVELOP REGIONAL STRATEGIES? OR ONE TEAM DOES IT ALL? Why are the WAFWA zone teams as opposed to Sage Grouse Management zone teams?

KK: move to mitigation section

~~In addition to improving management of resource uses and avoiding further surface disturbance, the ARMPAs identify management actions to promote the restoration and improvement of GRSG habitat~~, ~~Decisions related to improving and restoring habitat particularly addressing the threats of invasive species, pinyon and juniper expansion, as well as climate change. As with the management of uses, habitat management, restoration, and improvement action is prioritized first in SFAs, followed by PHMA, and then GHMA.~~

Comment [KK55]: Need to get the hierarchy of SFA, PHMA, GHMA into this section somewhere

~~The~~ARMPs/ ARMPAs ~~also~~ specify habitat objectives necessary for GRSG, used both to evaluate grazing and wild horse and burro management and for restoration purposes. These habitat objectives were developed for each of the GRSG's life history stages based on the ecology within each ARMPA's sub-region. These objectives will be used to meet the applicable land health standard in GRSG habitats. They also include maintaining a minimum of 70% of lands capable of producing sagebrush with 10-30% canopy cover, and address species richness and composition, as well as meeting land health standards considering the ecological potential for the site. ~~These habitat objectives are a core component of the adaptive management and monitoring strategy (see section 6 for more information). The ARMPA adaptive management and monitoring strategy provides for specific monitoring of GRSG and its habitat. The data collected is used to evaluate the effects of authorized uses, restoration, and other activities to determine if unexpected impacts to GRSG are occurring that require changes to management to meet the objectives.~~

Comment [JRL56]: DOESN'T WORK FOR ME!

Comment [KK57]: Tying adaptive management and monitoring to this section . . .

The ARMPAs also include specific decisions to improve habitat conditions and meet the habitat objectives related to treatment and removal of invasive annual grasses and the removal of encroaching pinyon juniper in SFA, PHMA, and GHMA, and restoration of degraded landscapes, including those impacted by fire events. ~~and post-fire restoration.~~

The COT identified wildfire and conversion of sagebrush habitat to invasive annual grass-dominated vegetative communities as two of the primary threats to the sustainability of GRSG in the Western portion of the species range (i.e., the Great Basin). The proposed LUPs contain a framework that provides a consistent approach to conduct assessments to identify priority habitat areas and management strategies to reduce the threats to GRSG resulting from impacts of invasive annual grasses, wildfires, and conifer expansion (FIAT 2014). To assist in addressing these threats, the Fire and Invasive Assessment Tool (FIAT) was developed to assess the major threats to the sagebrush-steppe in order to conserve the GRSG and its habitat. The purpose of the FIAT is to identify priority habitat areas and management strategies to reduce the threats to GRSG resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The FIAT is a process that uses the best available information from many disciplines including ecology, biology, soils, fire science as part of a strategic framework. The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers, et al., 2014b). The final FIAT process report was completed in June 2014 by the Fire and Invasive Assessment Team. The BLM, the Forest Service, and FWS agreed to incorporate this approach into the final GRSG EISs. The FIAT is also a key element of the

Integrated Rangeland Fire Management Strategy, identifying focal areas for priority actions in fire and fuel management.

The FIAT process:

- Identifies important GRSG occupied habitats and baseline data layers to define and prioritize GRSG habitats.
- Assesses their resistance to invasive annual grasses and resilience after disturbance.
- Prioritizes focal habitats for conservation and restoration.
- Identifies geospatially-explicit management strategies to conserve GRSG habitats.

BLM ARMPs/ describe goals, objectives, and management actions ~~and Forest Service LRMPs describe desired conditions, objectives, standards, and guidelines~~ to conserve GRSG, but do not provide specificity related to project prioritization, extent, and location, which is information important to the 2015 FWS listing decision. As such, FIAT products, in conjunction with the Integrated Rangeland Fire Management Strategy, fulfill a key role by providing quantified descriptions of future conservation actions to inform the GRSG listing decision to increase the efficacy of fire management efforts.

Comment [KK58]: This should probably be largely moved to the fire section below. Although invasive species treatments & PJ removal are not limited to fire priority areas, so I think some of that discussion still belongs here.

~~Also important to responding to the threat of fire and invasive plant species is the FWS-sponsored project with WAFWA that assembled an interdisciplinary team to provide additional information on wildland fire and invasive plants and developed strategies for addressing these issues. (Mayer et al, 2013) The FWS-sponsored project is based, in part, on NRCS soil surveys that include geospatial information on soil temperature and moisture regimes associated with resistance and resiliency properties. While this assessment is applicable across the range of GRSG, the analysis is limited to WAFWA GRSG Management Zones III, IV, and V (roughly the Great Basin region) because of the significant issues associated with invasive annual grasses and the high level of wildfires in this region.~~

Comment [KK59]: Not pertinent to the BLM ROD??

With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that inform that ARMPAs and supported the development of the *Integrated Rangeland Fire Management Strategy* are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.

The COT noted that "a monitoring program is necessary to track the success of conservation plans and proactive conservation activities. Without this information, the actual benefit of conservation activities cannot be measured and there is no capacity to adapt if current management actions are determined to be ineffective." The ARMPAs monitoring strategy has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can answer questions about how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of ARMPAs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for ARMPA effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.

Each proposed LUP includes an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored - habitat loss and/or population declines.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the proposed ~~LUPs~~ARMPAs, the BLM ~~and Forest Service~~ response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each proposed LUP, a soft trigger begins a dialogue between the state, FWS, and the BLM ~~or Forest Service~~ to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines). Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM ~~and Forest Service proposed LUPs~~ARMPAs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ~~and Forest Service proposed LUPs~~ARMPAs, the BLM ~~and/or Forest Service~~ will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the ~~proposed LUPs~~ARMPAs.

Comment [KK60]: This whole section needs to move to the monitoring & adaptive management section below – as I understand it from Matt, this needs to be its own section in the ROD.

~~With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that inform that ARMPAs and supported the development of the *Integrated Rangeland Fire Management Strategy* are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through~~

~~fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.~~

1.5.3 Reducing Threats of Rangeland Fire to GRSG and Sagebrush Habitat

The COT emphasized that " rangeland fire ~~o~~ (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency". For this reason, the ARMPAs ~~ameliorate the threat from fire, the ARMPs~~ seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used unless necessary to facilitate site preparation for restoration of GRSG habitat. The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks. Through guidance in the proposed ARMPAs supplemented by the *Integrated Rangeland Fire Management Strategy*, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.

In addition to and complementing the ARMPAs described in this ROD, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department".** (emphasis added) The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes in areas identified by the Fire and Invasives Assessment Tool (FIAT) in priority habitat, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT process, applying recent science, identified highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rural Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

1.6 Unique Aspects of the Great Basin ARMPAs

Comment [MEM61]: Still need input from Sarah G here related to the rationale as to why these differences exists.

The ARMPAs and their associated environmental impact statements were developed through four ~~separate~~ planning efforts across the Great Basin Region (as described in **Section 1.1**). A landscape approach was used to create cohesive management across the range of GRSG, while also using the subregional plans to accommodate differences in resource conditions, degree of threats, and state management approaches. ~~BLM's land use planning process is a highly collaborative process, involving local cooperating agencies, stakeholders, and members of the public. As a result of conducting four separate planning efforts, each sub-region received unique comments and feedback from their differing cooperating agencies, stakeholders, and interested members of the public. These comments were used to develop the ARMPAs and as a result, the management direction presented in each of the attached ARMPAs addresses sub-regional conditions and management. In addition, a~~As a result of the varying subregional threats, ~~that were presented to local populations~~ (refer to Table 1-2), conditions, and management, each sub-region, in collaboration with their local cooperators and considering public comments, adapted the range-wide landscape-management strategy ~~approach~~ to address these differences while ~~crafting different approaches to~~ meeting the overall ~~purposed and need~~ objective to conserve, enhance, and restore GRSG and their habitats. Below is a brief description of the unique aspects of each of the Great Basin sub-regional ARMPAs.

Idaho and Southwestern Montana

The Idaho and Southwestern Montana ARMPA adopted specific aspects of the State of Idaho's Conservation Plan for GRSG. The most ~~important varying~~significant aspect adopted from the State's plan is a third tier of habitat management area, Important Habitat Management Areas (IHMA). IHMA are BLM-administered and National Forest System lands that provide a management buffer for PHMA and connect patches of PHMA. I-HMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. In a landscape that is most threatened by fire and invasive species, this three-tiered approach allows land managers to focus suppression and restoration resources on those areas of highest importance while providing an acceptable additional level of flexibility in IHMA and GHMA since development is not as great a threat to habitat in the state. The three tiers ~~This three-tiered approach~~ also serve~~s~~ as the foundation for an adaptive management approach that includes habitat and population hard and soft triggers ~~in areas most valuable to the GRSG~~that when hit require ~~and the~~ shifting ~~of~~ IHMA to PHMA ~~when triggers are hit~~to maintain sufficient PHMA to support populations. The Idaho ARMPA also includes a slightly different disturbance calculation, as described in Appendix X of the attached Idaho and Southwestern Montana ARMPA. The ARMPA ~~also~~ applies land use planning allocation decisions for certain distances from leks, which is a deviation from the other Great Basin ARMPAs.

Nevada and Northeastern California

The Nevada portion of the Nevada and Northeastern California ARMPA adopts key elements of the State of Nevada Greater Sage-Grouse Conservation Plan (State of Nevada 2014) and the State of Nevada Conservation Credit System (Nevada Natural Heritage Program and Sagebrush Ecosystem Technical Team 2014) by establishing conservation measures and focusing restoration efforts in the same key areas most valuable to the GRSG. ~~Ad~~The Nevada plan allows for an exception to geothermal NSO which is an energy development priority for the state and is projected to create very limited disturbance in predictable areas over the life of the plan. For those reasons, after conversation with the USFWS, the BLM determined that this exception is consistent with overall conservation objectives. The ARMPA also adopts a Disturbance Management Protocol (DMP) to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, State of Nevada, and FWS. The plan provides for this exception due to unique factors in Nevada including the lower threat posed by development versus fire and invasive species, the extremely

Comment [JRL62]: THESE NEED TO BE INCLUDED AS APPENDICES TO THE ROD TO MAKE IT EASIER TO READ THE ROD AS A COMPLETE DOCUMENT.

KK: they will be attached to the ROD as appendices to each RMP.

Comment [KK63]: I think we should be more explicit about this & state clearly how it differs; this sentence is a bit opaque

Comment [JRL64]: What does this mean?

Comment [KK65]: GSD: don't know how to explain different disturbance calculation & allocation buffers.

Comment [KK66]: GSD: BLM needs to explain why we made limited use of CCS

Comment [KK67]: The list from Stephanie also included :unique disturbance approach – is that different from the DMP? If it is, GSD: BLM needs to explain limited nature of certain habitat types (including wet meadows and riparian areas) located mostly on private land, and the development of strong mitigation tools in the state which may make disturbance on publicly-managed PHMA along with protection for higher value habitat in the conservation interest of the species under certain circumstances. Given those factors and the procedural protections in place, the BLM determined that this approach is consistent with conservation objectives.~~ditionally, other unique aspects of the Nevada and Northeastern California ARMPA includes an NSO exception to geothermal leasing and development and a separate Disturbance Management Protocol (DMP) that is intended to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, State of Nevada, and FWS~~. The Nevada and Northeastern California ARMPA also does not have density cap, which is present in the three other Great Basin Region ARMPAs.

Comment [JRL68]: NEED TO EXPLAIN AND JUSTIFY –OTHERWISE MIGHT SEEM "ARBITRARY AND CAPRICIOUS"

KK: see revised text from GSD

Comment [JRL69]: NEED TO EXPLAIN WHY; GSD: BLM needs to explain

Comment [KK70]: Stephanie's list included "updated map" GSD: BLM must explain

Utah

The Utah ARMPA adopts the key elements of the GRSG conservation plans or directives developed by the State of Utah (Conservation Plan for Greater Sage-Grouse in Utah) and the State of Wyoming (Executive Orders 2011-05 and 2013-3), which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas deemed most valuable to GRSG. Additionally, within GHMA, the Utah ARMPA allows for wind energy and high voltage transmission ROW development (consistent with the mitigation framework for the ARMPA), as well as oil and gas development, which is open with standard constraints. The ARMPA provides additional flexibility for development in GHMA because 95% of the breeding GRSG in Utah are within PHMAs and understanding appropriate protections such as lek buffers and required design features will be analyzed and applied at the project-implementation stage. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

Comment [JRL71]: NEED TO CLARIFY – PERMITTED BY THE MITIGATION FRAMEWORK OR REQUIRING MITIGATION CONSISTENT WITH THE FRAMEWORK?

Comment [KK72]: Stephanie's list included: allocation/habitat exception language for GHMA – if that is different from what is here, GSD: BLM should explain

Comment [JRL73]: NEEDS CLARIFICATION

Oregon

The Oregon ARMPA adopts key elements of the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Hagen 2011) which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. In addition, the BLM plan adopts the unique disturbance cap approach developed by the state in which disturbance is capped at 1% per decade. The BLM Oregon plans provide additional flexibility for wind development in PHMA in the three counties that have SFAs by allowing for avoidance rather than exclusion in that part of PHMA that is outside of the SFAs. The BLM adopted this flexibility after coordination with the USFWS because of the priority the State of Oregon has placed on wind development in conjunction with the more rigorous disturbance cap approach and adaptive management triggers adopted by the Oregon plan. Avoidance for solar and wind in three SE counties in PHMA. Due to these factors, the BLM finds these limited areas of flexibility for wind development are consistent with overall conservation objectives.~~Also, three areas in southeastern Oregon within PHMA are not designated as exclusion areas to solar and wind energy development, but are instead avoidance areas to these types of development. This exception would not apply to areas designated as SFAs in this portion of southeastern Oregon.~~.

Comment [KK74]: JL: need to name the 3 counties

Comment [JRL75]: YES, NEED TO NAME

[SUGGEST INSERTION OF A SUMMARY TABLE HERE FROM THE LANDSCAPE REPORT THAT SHOWS DIFFERENCES BETWEEN OVERALL REGIONAL DIRECTION AND STATE-SPECIFIC MODIFICATIONS TO REGIONAL DIRECTION FOR THE 4 SUBREGIONAL PLANS!!!]

Formatted: Font: 14 pt, Bold

1.7 Summary of the BLM's National GRSG Planning and Conservation Strategy

Collectively, the BLM Great Basin subregional ARMPAs provide a landscape-level, science-based, comprehensive, coordinated, collaborative strategy for addressing previously identified threats to the GRSG and a means to remedy the need for "regulatory certainty" leading to the 2010 "warranted but precluded" finding by the FWS. ,

These plans reflect over a decade of research, analysis and recommendations for GRSG conservation produced by the WAFWA, the NTT, and the COT. Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research.

The COT report provided the primary blueprint for development of the GRSG conservation strategy embodied in the 15 sub-regional ARMPAs/ARMPs that will amend or revise 78 BLM and 20 Forest Service plans. Since the COT was chartered to provide guidance for the development of state and federal land management plans by the FWS with the backing of the Sage Grouse Task Force, this is appropriate.

Comment [JRL76]: ARE THESE NUMBERS CORRECT AND HOW MANY PLANS ARE WE NOW TALKING ABOUT?

In addition to these seminal documents, the Fire and Invasives Assessment Team (FIAT) report[7], the USGS compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on GRSG populations -- *Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review*, and the *Integrated Rangeland Fire Management Strategy: Final report to the Secretary* (Manier et al, 2014; DOI 2015b) provided important guidance in the development of critical aspects of the proposed ARMPAs/ARMPs and the overall GRSG landscape-level conservation strategy.

In combination with the sage-grouse conservation actions taken by the individual states within the remaining range of the bird and separate but connected initiatives to address the threat of rangeland fire, to curb the continuing spread of non-native invasive grasses, and to promote conservation measures to benefit the Greater sage-grouse on private lands, the BLM and Forest Service proposed ARMPAs/ARMPs are an essential component of the effort to conserve GRSG and its habitat and obviate the need for a listing of the species under ESA. Combined, the 15 sub-

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[7] Greater Sage-Grouse Wildfire. Invasive Annual Grasses, and Conifer Expansion Assessment. June 2013.

regional proposed ARMPAs/ARMPs would affect nearly half of the remaining habitat for the species.

Comment [JRL77]: Numbers? CHECK!

The BLM ARMPAs/ARMPs are the product of extensive coordination, including the active engagement of the FWS in helping to inform land allocation and related management decisions by the land management agencies. They also benefit from strong collaboration with the states and reflect the unique landscapes, approaches, and priorities in each. While this has added to the challenge of developing a complete, comprehensive, and coordinated conservation strategy, it has also strengthened the proposed ARMPAs/ARMPs and is likely to increase the commitment of all partners to implementation upon completion.

In the introduction to the COT report, the state and federal partners who authored the report reiterated their charge,

> "… the development of range-wide conservation objectives for the sage-grouse to define the degree to which threats need to be reduced or ameliorated to conserve sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future."

And, in his transmittal letter accompanying the final report, FWS Director Dan Ashe reaffirmed this charge, "I asked the team to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. … Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."[8]

The BLM ARMPAs/ARMPs were directly address the specific threats to the viability of the species identified in the COT report (many of which were also identified by the BLM NTT).

Land Allocations for Habitat Protection

The COT emphasized the need to avoid or minimize additional disturbance in PACs (which largely coincide with PHMAs in the proposed LUPs). "Stop the bleeding" was the emphatic plea of the COT with regard to the need to protect the highly valued PACs. As previously noted, the COT stated, "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation." Specifically, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT recommended an "avoidance first strategy" and stressed that "threats in PACs must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

In response, the BLM ARMPAs/ARMPs include goals and objectives and land use allocations and management actions for BLM-administered surface and subsurface lands and

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[8] COT report. Transmittal letter by Dan Ashe. February 2013.

resources in PHMAs to retain areas of existing habitats and to avoid new disturbance. Furthermore, the proposed plans avoid, minimize, and offset any unavoidable impacts associated with disturbance from projects that might be developed in PHMA in the future, subject to valid existing rights.

Land allocations to avoid and minimize additional disturbance in important habitat areas (identified as PHMAs in most ARMPAs/ARMPs) included some closures (primarily in portions of the Lander LUP) but rely primarily on the use of no surface occupancy (NSO) associated with any future development of oil, gas, and geothermal reserves in PHMAs for most proposed LUPs (with the exception of core areas in the Wyoming proposed LUPs and geothermal leasing in Nevada). Renewable energy development (solar and wind) is excluded in the PHMAs, in most proposed LUPs, with avoidance used in some proposed LUPs, particularly in Wyoming and Oregon.

Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in the large majority of PHMAs for non-energy leasable minerals and saleable minerals. An exception was granted for free use permits and the expansion of existing active pits for mineral material sales. The BLM will determine at the time of a new coal lease or lease modification whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are “essential habitat” for purposes of suitability determinations.

New rights of way for transmission lines, pipelines, and related infrastructure development in PHMAs will be avoided through restrictions on land use authorizations in the proposed LUPs. Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs unless there is a net conservation gain for GRSG.

In general, all forms of new development – from energy, to transmission lines, to recreation facilities and grazing structures would be excluded, avoided, or developed only if the resultant effect is neutral or beneficial to the GRSG in PHMA. In all instances, whether in PHMA or GHMA (except in Wyoming only in PHMA), any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation benefit for the GRSG.

While the COT report identified PACs as “crucial building blocks of a successful conservation strategy”, the COT also emphasized that “sage-grouse habitats outside of PACs may also be essential… [and therefore] conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities.” Consistent with this guidance, restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to seasonal and timing restrictions rather than NSO with limited exceptions and GHMA is generally an avoidance area for renewable energy rather than an exclusion area. However, any disturbance is subject to mitigation and should seek to first avoid, then minimize any adverse effects to habitat while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species (except in Wyoming).

The proposed ARMPAs/ARMPs provide an added element of habitat protection for GRSG strongholds identified by the FWS in a memo to Director Kornze and Chief Tidwell in October, 2014[9]. The proposed LUPs designate a subset of PHMA as Sagebrush Focal Areas (SFAs) to be administered by the BLM and the Forest Service. SFAs consist of areas of largely intact priority habitat, primarily under federal management, with greater GRSG bird densities and high resistance and resilience to fire. As the FWS communicated to BLM and Forest Service leadership that "[s]trong, durable, and meaningful protection of federally administered lands in these areas will provide additional certainty and help obtain confidence for long term sage grouse persistence," land allocations for these areas were intended to avoid future surface disturbance to the maximum extent. Land allocations in the SFAs require NSO with no exceptions for oil, gas, and geothermal development. The proposed plans will also include a recommendation that these areas be withdrawn by the Secretary from mineral entry under the 1872 Mining Act (in the RODs of proposed Forest Service plans). SFAs will also be prioritized for restoration and conservation action. While the SFAs have minimal land surface disturbance and, based on existing, available data, limited mineral potential, valid existing rights – as in all habitat – will be recognized and be able to proceed in accordance with their legal rights.

Management Direction, Prioritization, and Mitigation

In addition to land allocations to protect SFAs, PHMAs, and GHMAs, the ARMPAs/ARMPs guide other uses of these landscapes to meet COT objectives consistent with existing, authorized uses of GRSG habitats and the sagebrush landscape.

Grazing is the most widespread use of the sagebrush steppe ecosystem. In order to ensure that grazing continues in a manner consistent with the objective of conserving the GRSG, the proposed LUPs will require the incorporation of GRSG habitat requirements into the vegetative management objectives for proposed actions, including authorizations for grazing allotments, consistent with the ecological potential of the landscape. The COT recommends, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for GRSG (e.g. shrub cover, nesting cover)."

The proposed LUPs place a priority on the review and update of grazing allotment management to incorporate standards, guidelines, and habitat objectives, and to ensure that they are being met consistent with ecological site potential. Priority will be given, first, to the review of allotments in SFAs, then PHMAs, followed by GHMA; focusing first on riparian and wet meadows, and, if the standards, guidelines, or habitat objectives are not being met due to improper grazing, to work with the permittee to make progress towards meeting them. Anticipated increases in BLM funding for implementation of the proposed LUPs will support additional conservation and restoration actions, as well as monitoring, to continue to ensure healthy public land grazing consistent with the conservation of GRSG habitat.

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[9] Memorandum from Dan Ashe to Director, BLM and Chief, USFS, "Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important landscapes. October 27, 2014.

With regard to future leasing and development for oil and gas, the proposed LUPs recognize the value of encouraging future development in areas of low conflict with GRSG habitat. Analysis of existing and available data by the BLM indicates that a majority of the acres of land with high and medium potential for oil and gas development in the western U.S. are outside of identified GRSG habitat. To benefit GRSG conservation efforts and to assist developers in reducing the time and cost associated with oil and gas leasing and development in areas of likely conflict with other multiple-use values, the BLM will prioritize new leasing in areas outside of SFAs, PHMAs, and GHMAs.

Fire represents the greatest threat to GRSG survival in the Great Basin region. Recognizing the nature and extent of this threat, the ARMPAs/ARMPs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire, including fire prevention and the restoration of habitats impacted by fire. However, to develop a more complete and comprehensive strategy for dealing with this threat, the Department of the Interior and the BLM convened a conference in November, 2014 of scientists, state and federal officials, leaders in the fire community, and an array of stakeholders to discuss ways to improve the efficiency and effectiveness of rangeland fire management. The conference led to Secretarial Order 3336 and recognition that,

> "Protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department. Allocation of fire management resources and assets before, during, and after wildland fire incidents will reflect this priority, as will investmentsrelated to restoration activities.[10]

In accordance with that Order, a strategy for fire prevention, suppression, and post-fire restoration was developed and delivered to the Secretary in May 2015. The Order and subsequent report, *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary of the Interior*, directed substantial changes in policy and management direction affecting all aspects of the rangeland fire management program – from better coordination between resource managers and fire management officers; to the identification and prioritization of prevention, suppression, and restoration efforts in SFAs, PHMAs, and GHMAs; to the commitment of additional equipment and crews for rangeland firefighting; to additional funding and policy direction to improve post-fire restoration; to the completion of an initiative to collect, store, and better utilize native seed and sagebrush in post-fire restoration of sagebrush steppe ecosystems. This effort, and the initiative to fight the spread of non-native invasive species that contributes to higher rangeland fire risk (e.g. cheatgrass) discussed below, hold the potential to fundamentally change how rangeland fire is managed to benefit sagebrush ecosystems and GRSG habitat.

Comment [JRL78]: Add link

The COT report – and other more recent research and analysis – amplify concern for the contribution of cheat grass and other invasive species to the loss of GRSG habitat associated with increased fire frequency and intensity. Work initiated by the WAFWA and based on recent research by Chambers (Chambers et al, 2014b) led to the Fire and Invasives

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[10] Secretarial Order 3336. Rangeland Fire Prevention, Management and Restoration. January 2015.

Assessment Tool[11] and a subsequent assessment that identified areas of resistance and resilience to fire. This information is leading to targeted and aggressive efforts to reduce the risk and impacts of rangeland fire that could impact hundreds of thousands of acres of GRSG habitat, as well as restore areas with high potential to be resilient to the impacts of climate change and subsequent rangeland fires. The BLM is also committed to and accelerating the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasive species. In addition, by using the FIAT assessments and overlaying maps of SFAs, PHMAs, and GHMAs, land managers from all levels of government can more efficiently allocate and use fire resources at initial attack, to stop fire early and prevent catastrophic habitat loss.

Even prior to completion of the FIAT assessment, BLM shifted funding for fuels management to protect landscapes of importance to the GRSG. Under the FY2014 Omnibus Appropriation, BLM prioritized the funding of treatments and activities within each state that benefit GRSG.

In 2014, treatment and activities which identified GRSG as a species of interest accounted for $28,328,658 in funding and treatments of 241,343 acres. Prior to FY2014, numerous other examples of positive impacts from the Fuels Management Program exist. The table below summarizes (by state) accomplishments and funding spent on fuels reduction projects that benefited GRSG from FY2003 to FY2013 (Table Z) .[12]

Table Z. FY2003 to FY2013 Fuels Funds Spent on GRSG by State

State	Acres	Funding
CA	28,719	$5,762,190
CO	18,534	$1,942,940
ID	529,972	$32,326,379
MT	15,496	$3,688,980
NV	161,353	$11,126,931
OR	196,180	$12,131,581
UT	277,014	$21,507,312
WY	78,956	$3,601,211
Grand Total	**1,306,224**	**$92,087,524**

Some areas that were not included as PACs may still have great potential for providing important habitat if active habitat management is implemented. For example, removal of early-stage juniper stands may render currently unsuitable habitat into effective habitat for GRSG (this is also true for degraded habitats within PACs). The COT report encourages state and federal agencies to actively pursue these opportunities.[13] As noted in this report, since 2010, the NRCS through its Sage Grouse Initiative (SGI) in collaboration with states and private landowners and BLM on public lands have worked to eliminate pinyon-juniper trees on over 400,000 acres of

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[11] WAFWA FIAT report

[12] BLM Fuels Management Benefits Toward Sage Grouse Habitat. March 2014.

[13] COT Report. page 33.

private and over 400,000 acres of public lands, respectively, across western landscapes. In addition, using the FIAT the BLM has identified and prioritized areas for treatment of annual invasive grasses and conifer expansion on federal lands as a basis for improved targeting of federal resources[14] (See Figure Z. FY 2015 FIAT Priority Project Planning Areas). As illustrated, the areas designated as Priority 1and 2 project planning areas essentially coincide with the stronghold areas identified by the FWS and incorporated in the Great Basin ARMPAs as designated SFAs.

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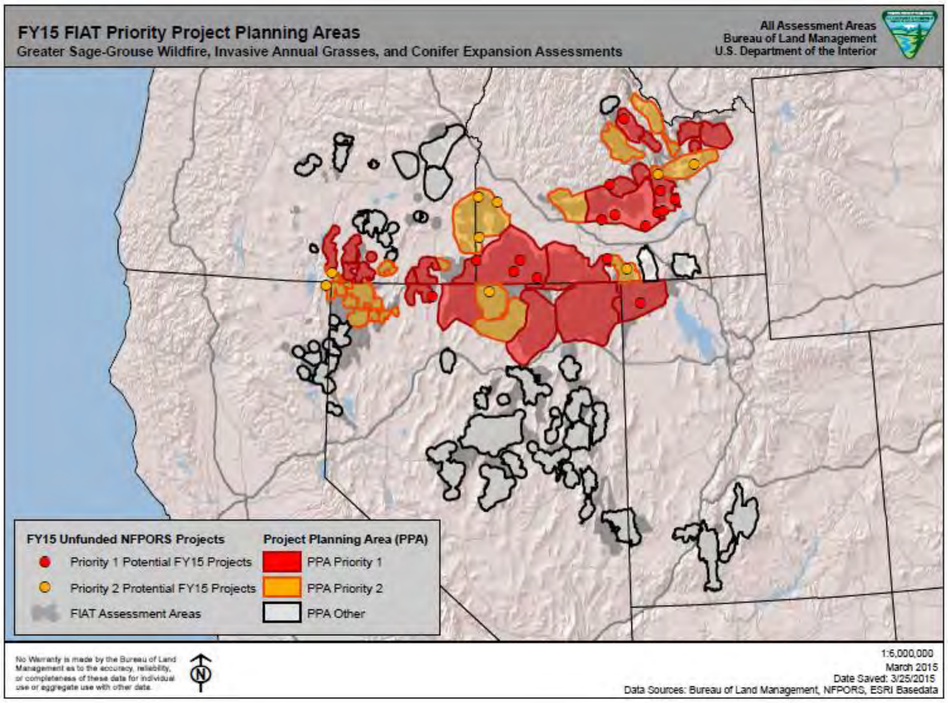

Figure Z. FY 2015 FIAT Priority Project Planning Areas with Focus on Invasive Annual Grasses and Conifer Expansion Assessments.

In addition, the Department has recently committed $7.5 million to projects in GRSG habitat to create more resilient landscapes and BLM has allocated $12 million to increase firefighting resources aimed at stopping fires while they are small in the Great Basin. The Department has identified required policy changes to increase the commitment, flexibility and timeframe for use of Emergency Stabilization and Burned Area Restoration (ES & BAR) funding on priority sagebrush-steppe habitats. Combined with commitments in the final rangeland fire report to Secretary Jewell to accelerate the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasives, these additional actions will lead to a more

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[14] WAFWA. Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment. June 2014.

robust and effective rangeland fire management effort in 2015 and beyond. In 2016 and beyond, BLM is anticipating a funding increase to implement the GRSG proposed LUPs; these increases are included in both the House and Senate FY 2016 appropriations marks and will lead to more robust and effective management of GRSG habitat and the threats to it, including fire. BLM intends to continue to prioritize and request funding for GRSG management in 2017 and beyond.

The proposed LUPs also target additional conservation efforts to address other threats to the GRSG. Proposed LUP direction to incorporate GRSG habitat objectives into the establishment of allowable management levels (AMLs) for wild horses and burros (free-roaming equids) and to prioritize gathers and removal to reach AMLs in SFAs, PHMAs, and GHMAs (in that order) will better target these efforts to benefit the GRSG.. Anticipated funding increases for GRSG proposed LUP implementation in FY 2016 will allow the BLM to make substantial progress toward that goal, beginning with efforts to achieve AMLs in SFAs. At the same time, the BLM has made a considerable investment in concert with the National Academy of Sciences in new research of methods to reduce wild horse and burro reproduction rates. Through a combination of targeted gathers and the development of an effective agent for reducing future free-roaming equid reproductive rates, the BLM is optimistic that, over time, this threat to GRSG can be effectively mitigated.

Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of a limited number of Presidential priority lines (Gateway West, Boardman to Hemingway, and Transwest Express, including those portions of Gateway South that are co-located) has been underway for a number of years. These lines are critical to expanding access to renewable sources of energy (especially wind) and to improving the reliability of the western grid. For these reasons, planning for these lines will proceed and potential impacts to GRSG will be fully mitigated (1) through micrositing to adjust the route to avoid important habitat and leks, (2) through transmission tower design to minimize the potential for adverse impacts to GRSG such as perching for predators, and (3) through compensatory mitigation measures, such as habitat restoration and pre-suppression activities to reduce the risk of habitat loss due to fire, to offset any unavoidable impacts to a conservation gain standard.

Mitigation for activities adversely impacting GRSG or GRSG habitat in PHMA or GHMA (PHMA only in Wyoming) will be designed to a net conservation gain standard consistent with the recommendation included in the September 2013 FWS report, *Greater Sage-Grouse Range-Wide Mitigation Framework*. According to the authors, the report was prepared

> "to communicate some of the factors the Service is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to GRSG. The recommendations provided here are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report for sage-grouse"[15].

At the same time, BLM and Forest Service will partner with the states over the next 6 months

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[15] USFWS. Greater Sage-Grouse Range-Wide Mitigation Framework. Version 1.0. September 3, 2014.

to develop regional mitigation strategies coinciding with WAFWA GRSG management zones, to guide mitigation efforts in each zone and monitor mitigation effectiveness. The collaborative effort to develop a mitigation strategy will ensure that mitigation is consistent with the principles and goals set out in Secretarial Order 3330, *Improving Mitigation Policies and Practices of the Department of the Interior* and accompanying report[16] and the new Departmental Manual guidance on landscape-level mitigation.

Additional conservation measures

In addition to land allocations and management actions included in the proposed LUPs to conserve the GRSG, measures were included to ensure that disturbance to leks could be reduced or minimized through the application of disturbance caps and required minimum buffer distances for a number of categories of disturbance, consistent with best available science.

Disturbance caps of 3% or 5% (for Wyoming and, likely in the future, Montana) were established in accordance with recommendations contained in the COT report. Disturbance will be calculated based on established Biologically-Significant Units (BSUs) developed by an interagency team and includes focus on protecting leks.

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The proposed ARMPAs also include an additional layer of protection for leks to be applied at project implementation. During NEPA development for a project, the appropriate buffer, based on the USGS report *Conservation Buffer Distance Estimates for GRSG – A Review* (Manier et al, 2014), will be used to site and mitigate projects, subject to applicable laws and regulations and valid existing rights. Because of the great variation in landscapes, local science, and local regulations, justifiable departures, both up and down, from these lek-buffer distances may be appropriate to fully address impacts to leks. In fact, the COT recommends that such conservation measures be based on best available science with consideration of local ecological conditions.

For BLM approved actions (not including Wyoming), the BLM and Forest Service will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis by preferentially locating the action outside of the buffer distance and, if that is not possible, approving the project only if certain criteria are met with the goal of ensuring no impacts to leks in PHMAs and no more than minor impacts in GHMAs.

This approach to minimizing impacts to leks reflects guidance from the COT report:

> "Conservation of sage-grouse habitats outside of the PACs should be closely coordinated with each state. For those states with sage-grouse management plans, or similar documents adequately addressing the conservation of sage-grouse that have been developed in coordination with FWS, decisions on management of those areas should defer to those plans. Conservation of habitats outside of PACs should include

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[16] Clement, J.P. et al. 2014. A strategy for improving the mitigation policies and practices of the Department of the Interior. A report to the Secretary of the Interior from the Energy and Climate Change Task Force, Washington, D.C., 25 p.

> minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur".[17]

Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy,* the BLM and Forest Service conservation strategy places heavy reliance on monitoring and evaluation to assess the success of management decisions incorporated in the proposed LUPs and, ultimately, in the effectiveness of implementing these proposed LUPs. Monitoring plans will be interagency in nature and incorporate evaluation of GRSG population trends by the states and changes in habitat condition by the federal land management agencies. As the WAFWA report states,

> "Monitoring provides the "currency" necessary to evaluate management decisions and to assess progress or problems. Adequate monitoring should be considered an integral and inseparable component of all management actions, and there, not optional. Lack of proper monitoring will undoubtedly hinder this large-scale conservation effort."[18]

In addition, the conservation strategy incorporates an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should changes in population levels or habitat conditions occur. If management responses to soft triggers do not adequately address the causes for population or habitat declines and "hard triggers" are reached, more significant changes in management actions and land allocations will occur to ensure that more protective measures to conserve the species are in place.

Guided by the COT report and NTT and WAFWA recommendations, the BLM and Forest Service conservation strategy directly addresses the threats identified in the COT report consistent with many of the specific recommendations provide by the COT, the NTT, and WAFWA. These changes in management direction from existing BLM (with the exception of the Lander LUP which was completed in 2014) and Forest Service LUPs are designed to avoid and minimize any additional surface disturbance in PHMAs and provide a high level of protection for FWS-identified stronghold areas. Recognizing the potential importance of areas in GHMA, the proposed LUPs include measures that protect and restore habitats in these areas while providing greater flexibility for development activities.

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The unprecedented collaboration with states in the development of these proposed LUPs, in conjunction with the close coordination between the BLM and Forest Service with input from the FWS, provides a strong foundation for conservation efforts to protect and restore habitats essential to the conservation of the GRSG. Informed by best available science, and in concert with additional actions, such as those to more efficiently and effectively address the threat of rangeland fire consistent with direction in S.O. 3336 and the investments made to improve sage-grouse habitat through voluntary actions on private lands through the NRCS' Sage Grouse Initiative (SGI), this strategy reflects a high level of commitment by state and federal partners to conserve the GRSG and its habitat. The landscape-level strategy consisting of reinforcing

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[17] COT Report, page 36.
[18] WAFWA report, page xxiii.

conservation actions that will go into effect upon completion of the BLM and Forest Service ARMPAs as well as those actions being implemented currently to conserve the species, reflect a significant change in management direction and philosophy for both resource management agencies since 2010 and a long-term commitment to assure the conservation of the species consistent with the objectives set in the 2006 WAFWA conservation strategy and embraced by both the NTT and the COT.

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments A, B, C, and D). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed. No further administrative remedies are available for these land use plan decisions.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in **Sections 1.1** of attachments A, B, C, and D. This ROD and ARMPAs become effective on the date this ROD is signed. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

The land use decisions provide conservation measures to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses

- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not for certain uses and are also used prioritize conservation and restoration management actions. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Management actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands..

The ARMPAs' management decisions were crafted to alleviate identified threats to GRSG and their habitats (see **Section 1.5**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not affect valid existing rights.

The ARMPAs do not contain decisions for the mineral estates of lands located in the planning area for lands under the jurisdiction of other Federal agencies such as the Forest Service, or for private or State-owned lands and minerals that are not administered by the BLM. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

- *Statutory requirements*. The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy*. The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations*. These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

During preparation of the ARMPAs for all four sub-regions, minor changes were made to the Proposed RMP Amendments to correct errors and to clarify decisions. Clarifications and corrections made since the Proposed RMP Amendments were published on May 29, 2015 are hereby adopted by this ROD.

2.4.1 Modifications and Clarifications by Sub-region

Modifications and clarifications are summarized below for each of the sub-regional ARMPAs.

Idaho and Southwestern Montana

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Nevada and Northeastern California

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Oregon

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Utah

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

2.4.2 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed

RMPA/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four sub-regional PRMPAs/FEISs.

These decisions are final for the Department of the Interior. With the exception of the granted protest issues, the Director concluded that the BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party will be notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.5.1.

Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Idaho and Southwestern Montana GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Nevada and Northeastern California

For the Nevada and Northeaster California GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Nevada and Northeastern California Sub-Regional GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Oregon

For the Oregon GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Oregon GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Utah

For the Utah GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Utah GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

2.4.3 Governors Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

In some instances, modifications to the Proposed RMP Amendments were addressed based on recommendations submitted to the BLM by the applicable states. These modifications to the ARMPAs are summarized below by sub-region and are now part of the attached ARMPAs.

Idaho and Southwestern Montana

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Nevada and Northeastern California

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Oregon

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Utah

Will need to populate the "X" areas towards the end of the GCR process (end of July).

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs influencing land management for the protection and enhancement of GRSG and its habitat. All management under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law there are typically few or no distinctions between alternatives.

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the USFWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix X, Required Design Features (RDFs), of each of the attached ARMPAs.

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, most management actions in GHMA reverted back to the No Action Alternative, which was found to not meet the purpose and need for the Amendments.

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below).

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required to conserve GRSG and its habitats. Alternative C was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which was identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocations are less stringent, but still aim to protect GRSG habitat (for example, applying moderate constraints and stipulations to fluid minerals in GHMA).

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative provided by the State or Governor's offices for inclusion and analysis in the EISs. It incorporates guidance from specific state conservation strategies, if developed or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. This document describes the Oregon Department of Fish and Wildlife's proposed management of GRSG on Federal lands. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, the planning area includes all occupied GRSG habitat in Utah. Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. Alternative E1 was designed to eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected, in whole, as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the ARMPA were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. Alternative F was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM has developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focus on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative Considered in all Sub-Regions

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

Idaho and Southwestern Montana

- USFWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- USFWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

Utah

- USFWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. MANAGEMENT CONSIDERATIONS

The BLM is tasked to provide multiple use management for public lands by the Federal Land Policy and Management Act (FLPMA) and numerous other laws and regulations that govern the management of public lands. Due to the diversity of community needs and stakeholders affected by management of BLM lands, there has been both support and opposition to certain components of the Proposed Plans. BLM's objective in choosing the Proposed Plan Amendments as the ARMPAs was to address diverse needs and concerns in a fair manner and provide a practical and workable framework for management of public lands in GRSG habitat. The BLM is ultimately responsible for preparing these ARMPAs consistent with its legal mandates that reflect collective professional judgment using the best available science. The ARMPAs provide a balance between those reasonable measures necessary to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat to meet the purpose and need of these plan amendments, and the ongoing public need for use of the public lands within the Great Basin Region planning area.

The ARMPAs were selected because they will reduce or eliminate threats to GRSG at a landscape scale, improve and sustain properly functioning resource conditions, and consider needs and demands for existing or potential resource commodities and values. In the end, GRSG habitat will be managed by integrating ecological, economic, and social principles in a manner that safeguards the long term sustainability, diversity and productivity of the land.

In 2012, the FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as articulated in the COT report – is summarized in **Table 1-2**. **Table 1-3** provides a crosswalk between the threats to GRSG and their habitat identified in the COT Report and the key management responses from the ARMPAs that aim to ameliorate these threats.

Comment [JRL81]: Addressed above.

~~5. MITIGATION MEASURES~~

~~In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the GRSG including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the FWS in its 2010 listing decision (75 FR 13910), COT report, and depicted in the ARMPAs' Monitoring Framework (which can be found in Appendix X of each of the attached ARMPAs). Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g. avoid, minimize, and compensate). If impacts from BLM management actions and authorized third-party actions (which are consistent with the goals, objectives, and management actions in the attached ARMPAs) that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation would be durable, timely, and in addition to what would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in the Mitigation Strategy, which can be found in Appendix X of each of the attached ARMPAs).~~

~~All practical means to avoid or minimize environmental harm, specifically to GRSG and its habitat are encompassed in the attached ARMPAs and associated appendices. Mitigation measures, including the application of required design features have been identified.~~

~~The ARMPAs also identify the development of regional mitigation strategies, in partnership with the states, to guide and target mitigation to achieve the greatest benefit to GRSG and habitat conservation and restoration. Within 90 days of the issuance of the Record of Decisions, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for actions and third party authorizations that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat. The mitigation strategy will be developed within one year of the issuance of the Record of Decisions.~~

~~6. PLAN MONITORING AND ADAPTIVE MANAGEMENT~~

Comment [MEM82]: Moved content from the original Section 1.5.3 to here. The CEQ regs do not state that "monitoring" needs to be a standalone, so I think we are ok here.

~~Plan Monitoring~~

~~Monitoring tied to the ARMPAs has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can assess how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of ARMPAs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for ARMPA effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.~~

~~The BLM Assessment, Inventory, and Monitoring (AIM) Strategy (Toevs et al. 2011 and IB2012-080) describes a vision for integrated, cross-program assessment, inventory, and monitoring of resources at multiple scales of management. Following the AIM Strategy, the BLM is modernizing its resource monitoring approach to more efficiently and effectively meet local, regional, and national resource information needs. The AIM Strategy provides a process for the BLM to collect quantitative information on the condition, trend, amount, location, and spatial pattern of natural resources on the public lands. Each AIM-Monitoring survey, at any scale of inquiry (from the plot level to west-wide deployments), uses a set of core indicators, standardized field methods, remote sensing, and a statistically-valid study design to provide nationally-consistent and scientifically-defensible information to determine conditions (e.g., rangeland health) and trends on public lands.~~

Comment [KK83]: I think this can all be deleted and the first sentence can just flow into the next paragraph

~~The National-scale deployment of AIM, known as the Landscape Monitoring Framework (LMF), commenced in 2011 in coordination with NRCS, with the collection of 1,000 plots of field-collected monitoring data across the Western U.S. LMF aims to provide non-biased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. A group of GRSG habitat and sagebrush plant community subject matter experts from BLM, USFWS, WAFWA, NRCS, ARS, state wildlife agencies, and academia identified those vegetation indicators collected at LMF sampling points that inform GRSG habitat needs. The common indicators that were identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, inter-canopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of GRSG, additional plot locations in occupied GRSG habitat (Sage-grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS Rangeland Monitoring Survey. The GRSG baseline data will be collected over a five year period and an annual report will be prepared describing the status of the indicators. Beginning in year six, the annual status report will be accompanied with a trend report which will be available on an annual basis thereafter contingent upon continuation of the current monitoring budget. This information, in combination with mapping information, mid-scale habitat suitability indicator measures, and sagebrush availability information will be used to assess the effectiveness of the planning strategy.~~

~~The BLM has made significant commitments in the ARMPAs to monitoring actions to conserve GRSG habitats at multiple scales. The results from the monitoring will inform the agencies of the effectiveness~~

~~of efforts to reduce disturbance and restore seasonal habitats in priority areas, and of the status of the triggers set in the proposed LUPs for adaptive management. The BLM will report annually on the results of the monitoring efforts.~~

~~The BLM's Monitoring Framework can be found in Appendix X of each of the attached ARMPAs.~~

~~Adaptive Management~~

~~The ARMPAs include an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored – habitat loss and/or population declines. Adaptive Management with specific triggers provide additional certainty that the regulatory mechanisms included in the ARMPAs are robust and able to respond to a variety of conditions and circumstances quickly and effectively to conserve GRSG habitat.~~

~~Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the proposed LUPsARMPAs, the BLM's response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each ARMPA, a soft trigger begins a dialogue between the state, FWS, and the BLM to see if the causal factor can be determined and what implementation level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines).~~

~~Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the attached ARMPAs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs, the BLM will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the ARMPAs. ARMPA specific strategies can be found in Appendix X of each of the attached ARMPAs.~~

7. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

The BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department of the Interior policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning

bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date.

7.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Proposed RMP Amendments/FEIS, Idaho and Southwestern Montana conducted seven public meetings, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plans. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft EISs' comment periods. Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMP Amendments.

A Notice of Availability (NOA) for the Great Basin Region GRSG Proposed RMP Amendments and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governors' consistency review. Refer to **Section 2.5** for a full description of the protest period and governors' consistency review outcomes.

7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the USFWS and the U.S. Forest Service. In addition, the Great Basin sub-regions' also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 13 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. For a full list of these cooperating agencies divided by sub-region, refer to the Cooperating Agencies List at the beginning of this ROD. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs.

7.2 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the USFWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the USFWS for review. The USFWS evaluated the biological assessments and concurred with the "no affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the threatened listed Utah Prairie Dog. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix X of Attachment X).

[Verify that the above paragraph is applicable to UT once BLM UT hears back from their local FWS.]

7.3 Native American Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts

related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

The Draft RMP Amendments/EISs were provided to the Idaho, Montana, Nevada, California, Oregon, and Utah State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMP Amendments/FEISs were also provided to the SHPOs.

[Verify that the above paragraph is applicable to UT.]

7. REFERENCES

Comment [MEM84]: Need to ask EMPSi if they can formulate.

8. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. The Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published on May 29, 2015, in the Federal Register (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

I hereby approve the land use plan amendments decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Sally Jewell Secretary Department of the Interior	Date

9. ATTACHMENTS

Comment [JRL85]: SUGGEST, AS NOTED, THAT WE INCORPORATE REFERENCED APPENDICES IN THE ROD HERE SEPARATE FROM THEIR APPEARANCE IN EACH OF THE RELEVANT PLANS. THE ROD SHOULD READ AS A "STAND ALONE" DOCUMENT.

Appendix A. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix B. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Appendix C. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

PL_PUB_3716
9.1

Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana; Nevada and Northeastern California; Oregon; and Utah

Prepared by:

U.S. Department of Interior
Bureau of Land Management
Washington, DC

September 2015

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WO/XX/XX-XX+XXX

Comment [JRL1]: NTS – where does this come from?
Kk: This is BLM's mission statement. I don't know when it was originally developed, but we use it regularly in our materials & on our web pages

Cooperating Agencies

Great Basin Region-Wide

US Fish and Wildlife Service
US Forest Service

Idaho and Southwestern Montana

Beaverhead County Commissioners
Bingham County Commissioners
Blaine County Commissioners
Cassia County Commissioners
Clark County Commissioners
Craters of the Moon National Monument
Custer County Commissioners
Fremont County Commissioners
Idaho Association of Counties
Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
Idaho National Guard
Jefferson County Commissioners
Lemhi County Commissioners
Madison County Commissioners
Montana Fish, Wildlife and Parks
Natural Resources Conservation Service
Owyhee County Commissioners
Power County Commissioners
Twin Falls County Commissioners
US Department of Defense
US Department of Energy (INL)

Nevada and Northeastern California

Churchill County
Elko County
Eureka County
Humboldt County
Lander County
Lassen County
Lincoln County
Mineral County
Modoc County
Natural Resources Conservation Service
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Department of Conservation and Natural Resources
Nye County
Pershing County
Pyramid Lake Paiute Tribe
Storey County
Summit Lake Paiute Tribe
Susanville Indian Rancheria
US Department of Defense
US Federal Highway Planning Administration
Washoe County
Washoe Tribe
White Pine County

Oregon

Crook County
Deschutes County
Harney County
Harney Soil and Water Conservation District US
Lake County
Malheur County
Natural Resources Conservation Service
Oregon Department of Fish and Wildlife
Oregon State University
US Federal Energy Regulatory Commission

Utah

Beaver County
Box Elder County
Carbon County
Confederated Tribes of the Goshute Indian Reservation
Duchesne County
Emory County
Garfield County
Grand County
Iron County
Kane County
Lincoln County
Miller County
Piute County
Rich County
San Pete County
Sevier County
State of Utah (PLPCO)
Sweetwater County
Sweetwater County Conservation District
Tooele County
Uinta County (UT and WY)
Utah County
US Department of Defense
Wayne County
Natural Resources Conservation Service

[Insert BLM WO Letterhead]

In Reply Refer To:
In Reply, Refer to:
(WO210)(1610)

Dear Reader:

Enclosed are the Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). The ROD approves the four Great Basin Region ARMPAs, which are part of seventeen other sub-regional RMP Amendments and RMP revisions associated with the National Greater Sage-Grouse Planning Strategy that was initiated on December 11, 2011.

The Bureau of Land Management (BLM) ARMPAs provide a ~~range wide~~ landscape-level, ~~comprehensive~~, science-based, collaborative strategy for addressing previously identified threats to the greater sage-grouse (GRSG) and its habitat. This strategy, while designed to address issues leading to the U.S. Fish and Wildlife Service's (FWS) 2010 "warranted but precluded" decision, was guided by over a decade of research, analysis and recommendations for GRSG conservation produced by the Conservation Objectives Team (COT) Report and the BLM National Technical Team and (NTT). Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research. Science-based decision-making and collaboration with the FWS, the U.S. Forest Service, and state and other partners were fundamental during the development of ~~the land use plan decisions within~~ these ARMPAs to address the identified threats to GRSG.

It is important to note that this ROD and these ARMPAs are specific only to BLM-administered lands. Throughout the GRSG planning process, the U.S. Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

The Federal Land Policy Management Act (FLPMA) requires the development and maintenance, and, as appropriate, the revision of land use plans for public lands. The National Environmental Policy Act (NEPA) requires Federal agencies to prepare an Environmental Impact Statement (EIS) for major Federal actions that could significantly affect the environment. In fulfillment of these requirements, the Draft

Comment [JRL2]: NEED TO CLARIFY WHAT THIS IS AND WHAT TRIGGERED THE "START" OF THE STRATEGY – not referenced in the ROD precisely as "start" of strategy.

Comment [JRL3]: NOT RANGEWIDE, SINCE BLM PLANS DON'T COVER THE ENTIRE RANGE. THEY ARE "LANDSCAPE-LEVEL".

Comment [JRL4]: NOT COMPREHENSIVE SINCE OTHER ACTIVITIES – E.G., IMPLEMENTATION OF THE RANGELAND FIRE STRATEGY IS ALSO A PART OF A "COMPREHENSIVE" STRATEGY – AND NOT PART OF THE DECISIONS COVERED IN THE ARMPAs.

Comment [GSD5]: FWS does not capitalize and neither does the Dept in our materials . . .

Comment [MEM6]: Caps is consistent with other BLM planning docs and our tech. guide. May need to discuss.

Comment [KK7]: Culminating in? – COT & NTT didn't really produce the decade of research, and analysis; or ". . . guided by over a decade of research for GRSG conservation and analysis and recommendations provided by the COT . . ."

Comment [JRL8]: Shouldn't this be "hyphenated" every time?
KK: contractor will take care of editorial items

RMP Amendments/Draft EISs incorporating analysis and input provided by the public; local, State, and other Federal agencies and organizations; Native American tribes; Cooperating Agencies, and BLM personnel were published in the fall of 2013. The 90-day public comment periods ensued, with more than 4,990 substantive comments from 1,348 letters that were submitted. These comments were reviewed, summarized and considered in preparing the Proposed RMP Amendments/Final EISs.

Comment [JRL9]: For all plans or just those in this subregion?
KK: just this subregion

The Proposed RMPAs/Final EISs were made available on May 29, 2015, for a 60-day governor's consistency review and 30-day protest period. The BLM received consistency review letters from X and has worked closely with these states to resolve these inconsistencies. X protest letters were received, of which X were valid protests in need of resolution. Protest issues are addressed and resolved in the Protest Summary Report, available on line at: http://www.blm.gov/nv/st/en/fo/wfo/blm_information/rmp.html.

After much consideration, the BLM now approves the attached ARMPAs as the land use planning documents that will guide greater sage-grouse habitat management and uses that may affect the GRSG and its habitat in the Great Basin Region for the life of the plan amendment for the benefit of GRSG and over 350 other species of wildlife as well as many other land uses, like grazing and recreation, that depend on ~~a~~ healthy sagebrush-steppe landscapes.

Comment [JRL10]: Actually, all land and resource management in the affected area – better to clarify?
KK: suggested edit

Copies of the ROD and ARMPAs can be obtained from the BLM's National Greater Sage-Grouse webpage at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html.

The BLM extends special appreciation to the extensive public involvement and the involvement of groups, organizations, Cooperating Agencies; local, State, and other Federal agencies; and Native American tribal representatives who contributed to the completion of these ARMPAs. This participation informed and improved the planning process and the planning documents. Your continued involvement is encouraged as the ARMPAs are implemented and monitored for the conservation of Greater sage-grouse and their habitat.

Sincerely,
X

Enclosure:
1. Record of Decision and Approved Resource Management Plan Amendments

Summary

This Record of Decision (ROD) is the culmination of an unprecedented effort in public land management to meet the multiple-use and sustained-yield management objectives for public lands administered by the Bureau of Land Management (BLM) in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA).

In response to a 2010 determination by the U.S. Fish and Wildlife Service (FWS) that the greater sage-grouse listing under the Endangered Species Act (ESA) is "warranted but precluded" by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service), has developed a targeted, multi-tiered, landscape-level management approach, based on the best available science, that offers the highest level of protection for Greater Sage-Grouse (GRSG) in the most important habitat areas to address the specific threats identified in the 2010 U.S. Fish and Wildlife "warranted but precluded" decision and Conservation Objectives Team (COT) report.

This Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon; and Utah includes land use allocations in the ARMPAs that limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs implement a suite of management actions, such as the establishment of disturbance limits, GRSG habitat objectives, mitigation requirements, monitoring protocols, and adaptive management triggers and responses, as well as other conservation measures throughout the range. The cumulative effect of these conservation measures work in concert to protect, improve, and restore GRSG habitat across the remaining range of the species in the Great Basin and provide greater certainty that BLM land and resource management activities in GRSG habitat in the Great

Basin Region can lead to conservation of the GRSG and other sagebrush-steppe associated species in the region.

The targeted land use plan protections presented in this ROD and ARMPAs do not only protect the greater sage-grouse and their habitat, but also the over 350 wildlife species that call the sagebrush-steppe ecosystem home. Reversing the slow degradation of this valuable ecosystem will also benefit local rural economies and a variety of rangeland uses in addition to habitat protection, ~~ranging from~~ including recreation and ~~to~~ grazing ~~and energy development~~, in a manner that safeguards the long term sustainability, diversity and productivity of the land.

This conservation strategy, developed in collaboration with the 11 states in which the ARMPAs and ARMPs apply, in addition to other state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna, in order to "conserve the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT report. 2014]

Comment [GSD11]: We may want to add some language at the end here from the rollout materials about targeted protections that benefit GRSG, 350+ other species as well as economic activity that depends on a healthy range.

Comment [MEM12]: Added this last paragraph based on Sarah G's suggestion. Will this work or should we flesh out more?

Table of Contents

Dear Reader Letter

Summary

List of Tables

[Develop once there is a final draft]

List of Figures

[Develop once there is a final draft]

List of Acronyms

[Develop once there is a final draft]

1. INTRODUCTION

This Record of Decision (ROD) approves the Bureau of Land Management's (BLM) attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM--administered lands. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.), BLM planning regulations (43 Code of Federal Regulations [CFR] §1601 *et seq*.), and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA) and the Council on Environmental Quality's Regulations for implementing the procedural provisions of NEPA (40 CFR §1500.1 *et seq*.).

Comment [JRL13]: Hyphen?

Throughout the GRSG planning process, the ~~U.S.~~ Forest Service has been a Cooperating Agency on the Idaho and Southwestern Montana, Nevada and Northeastern California, and the Utah planning efforts. All three of these Draft RMPAs/Draft EISs and Proposed RMPAs/Final EISs included proposed GRSG management direction for National Forest System lands. The ~~U.S.~~ Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Comment [JRL14]: Cited previously, so should reference consistently through here on out.

1.1 Great Basin Region Planning Area

The Great Basin Region is composed of four sub-regions, the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah sub-regions (see **Figure 1-1** – Great Basin Region Greater Sage-Grouse Sub-regions). Four separate National Environmental Policy Act (NEPA) documents were prepared for each of these sub-regions. Each sub-region conducted its own planning effort with input from local cooperators, stakeholders, and members of the public. The sub-regional boundaries were constructed to align with BLM administrative offices, state boundaries, as well as areas that shared common threats to the GRSG and their habitat. The boundaries for these sub-regions largely coincide with zones III, IV, and V identified by the WAFWA Greater Sage-Grouse Conservation Strategy to delineate management zones with ~~similarecological~~similar ecological and biological issues and similarities.

Comment [KK15]: We could add the WAFWA zones here as one additional element used to make the region/subregion boundaries??

[Insert **Figure 1-1** - Great Basin Region Greater Sage-Grouse Sub-regions]

The Great Basin Region planning area boundaries include all lands regardless of jurisdiction (see **Figure 1-2** - Great Basin Region Planning Area, Greater Sage-Grouse Habitat Management Areas). **Table 1-1** outlines the amount of surface acres that are administered by specific Federal agencies, states, local governments, and lands that are privately owned in the four sub regions that make up the Great Basin. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPAs do not establish any additional management for these lands; these lands will continue to be managed according to the existing land use plan for the areas.

[Insert **Figure 1-2** - Great Basin Region Planning Area, Greater Sage-Grouse Habitat Management Areas]

Table 1-1
Land Management in the Great Basin Planning Area

Surface Land Management	**NV/NE CA**	**ID/SW MT**	**Utah**	**Oregon**	**Great Basin Total**
BLM	45,359,000	12,449,000	20,387,200	12,615,900	**90,811,100**
Forest Service	9,719,900	13,252,400	7,396,300	6,454,800	**36,823,400**
Private	11,857,800	13,637,700	10,818,200	10,907,900	**47,221,600**
Bureau of Indian Affairs (tribal)	922,000	343,600	1,140,000	191,900	**2,975,500**
USFWS	805,900	121,900	121,900	482,500	**1,491,700**
Other	326,100	414,400	30,400	100,700	**871,600**
State	195,600	2,646,100	5,137,200	723,100	**8,702,000**
National Park Service	160,100	511,700	1,365,600	0	**2,037,400**
Other federal	3,200	562,200	0	61,300	**626,700**
Bureau of Reclamation	431,200	116,300	800	52,700	**601,000**
Local government	17,800	0	0	900	**18,700**
Department of Defense	402,000	127,400	1,812,300	64,500	**2,406,200**
Total acres	**70,200,600**	**44,142,200**	**48,209,900**	**31,656,300**	**194,208,300**

Source: BLM GIS 2015

The decision area for the Great Basin Region ARMPAs is BLM-administered lands in GRSG habitat management areas (see **Figure 1-3** - Great Basin Region Decision Area , Greater Sage-Grouse Habitat Management Areas), including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the Great Basin Region ARMPAs apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

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Comment [JRL16]: HOW DO THESE DECISIONS DIFFER FROM OTHER LAND USE DECISIONS?
KK: should this sentence be deleted? It just seems to open the door to a debate about whether every decision in the plan really is necessary for conservation. And obviously, since this amendment is for GRSG conservation, all decisions are pertinent to that.

[Insert **Figure 1-3** - Great Basin Region Decision Area, Greater Sage-Grouse Habitat Management Areas]

1.2 Threats to Greater Sage-Grouse

Currently, GRSG occupy an area that has been estimated to be a reduction of 44% from the historically occupied range. In addition, populations in most or all the range have been demonstrated to have declined from 1965- 2003, the period where data was collected most intensively.

The decline of the GRSG and its sagebrush-steppe habitat has been the focus of fish and wildlife agency and conservationists' concerns for decades. In 1994 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of GRSG. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of GRSG population losses and degradation of sagebrush ecosystems in order to: 1) Maintain the present distribution of GRSG and 2) Maintain the present abundance of GRSG. In 1999 WAFWA amended the objectives to: 1) Maintain and increase where possible the present distribution of GRSG and 2) Maintain and increase where possible the present abundance of GRSG. The Bureau of Land Management, USFWS, and U.S. Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000.

Between May 1999 and December 2003, eight petitions were filed with the U.S. Fish and Wildlife Service (USFWS) to have sage-grouse protected under provisions of the Endangered Species Act (ESA). In 2001 the USFWS determined that greater sage-grouse in the Columbia Basin of Washington state warranted protection under provisions of the ESA. On January 12, 2005, the FWS issued a decision that listing the GRSG for protection under the ESA was not warranted. However, in response to July 14, 2006 Western Watersheds Project filing alleging that the FWS 2005 finding was incorrect and arbitrary, the U.S. District Court of Idaho ruled that the 2005 finding was "arbitrary and capricious" and remanded it to the FWS for further consideration. Ultimately, as a result, in 2010 the FWS issued a finding that listing of the Greater sage-grouse was "warranted but precluded". Subsequent to that finding ~~and in accordance with a settlement agreement,~~[details?] the FWS committed to make a final determination regarding the need to list the GRSG by September 30, 2015. Two factors led to the FWS decision to list the species as "warranted but precluded": threats to habitat and the inadequacy of existing regulatory mechanisms.

Comment [JRL17]: Need to address.

Comment [KK18]: I suggest we just delete it – don't think this is necessary for the BLM ROD

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The USFWS has identified a number of threats to GRSG in the Great Basin Region, focusing on the present and widespread threats of wildfire and the loss of native habitat to invasive species. Other threats, some of which are more localized by nature, include habitat fragmentation due to anthropogenic disturbances associated with energy development, mining, infrastructure, recreation, urbanization and sagebrush elimination, as well as disturbance associated with free-roaming equids and improper livestock grazing.

Additional information regarding potential threats to the GRSG is contained in the BLM National Technical Team (NTT) report and the Conservation Objectives Team (COT) reports. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as articulated in the COT report – is summarized in **Table 1-2**.

In addition, the FWS found that existing local, state and federal regulatory mechanisms were not sufficient to address threats to the habitat. For the BLM, which manages more than 40 percent of the remaining habitat range wide, regulatory mechanisms are the agency's Resource Management Plans (RMPs).

Comment [JRL19]: DO WE NEED TO FOOTNOTE SINCE WE USE "RANGE" AS THE BASE HERE AND A DIFFERENT CHARACTERIZATION/REFERENCE IN OTHER PARTS OF THE DOCUMENT?

The BLM initiated this planning effort with the U.S. Forest Service to provide the needed federal regulatory mechanisms to address the individual threats listed in Table 1-3. This ROD approves the BLM's attached ARMPAs for the Great Basin Region GRSG Sub-regions (Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah). This ROD and the attached ARMPAs provide a set of management decisions focused on specific GRSG conservation measures across the Great Basin Region on BLM- administered lands. ~~The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).~~

Comment [KK20]: I'm inclined to delete this as unneeded here

Comment [KK21]: Already in the 1st paragraph of the intro

Table 1-2. Threats to GRSG in the Great Basin Region (Utah) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan**
Rich-Morgan-Summit (UT)	9b				Y	Y	Y	Y		Y			Y	Y	Utah
Uintah (UT)	9c				Y	Y	Y	L	Y	Y			Y	Y	Utah
Strawberry Valley (UT)	10a	Y			Y	Y	Y	Y		Y			Y		Utah
Carbon (UT)	10b	Y			Y		Y	Y	Y	Y			Y		Utah
Sheeprock Mountains (UT)	11	Y			Y	L	L	Y	Y	L		Y	L		Utah
Emery (UT)	12	Y			Y	Y	Y	Y	Y	Y			Y		Utah
Greater Parker Mountain (UT)	13a				Y	Y	Y			Y			Y		Utah
Panguitch (UT)	13b			Y	Y	Y	Y	Y	L	Y			Y	L	Utah
Bald Hills (UT)	13c	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Utah
Ibapah (UT)	15a	Y			Y	Y	Y	Y	Y	Y		Y	Y		Utah
Hamlin Valley (UT)	15b	Y			Y	Y	Y			Y		Y	Y		Utah
Box Elder (UT)	26b			Y	Y	Y	Y	L	Y	Y			Y		Utah

Table 1-2. (cont.) Threats to GRSG in the Great Basin Region (OR, CA, NV, ID, SWMT) as identified by the Conservation Objectives Team (COT; 2013). Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, and U = unknown.

Population	**Unit Number**	**Isolated Small Size**	**Sagebrush Elimination**	**Agriculture Conversion**	**Fire**	**Conifers**	**Weeds/Annual Grasses**	**Energy**	**Mining**	**Infrastructure**	**Grazing**	**Free-Roaming Equids**	**Recreation**	**Urbanization**	**EIS/Plan(s)**
N. Great Basin (OR, ID, NV)	26a		L	L	Y	Y	Y	L	L	Y	Y	L	Y	Y	ID/SW MT, OR, NV/CA
Baker (OR)	17	Y	Y	Y	Y	L	Y	L	Y	L	U		L	L	OR
Central Oregon (OR)	28		L	L	Y	Y	Y	L	Y	L	Y	U	L	L	OR
W. Great Basin (OR, CA, NV)	31		L	L	Y	Y	Y	L	L	L	Y	Y	U		OR, NV/CA
Klamath (CA)	29	Y	U	U	Y	Y	Y	L		U	U	U	U	U	NV/CA
Northwest Interior (NV)	14	Y			Y		Y	U	Y	Y	Y	Y	Y		NV/CA
Southern Great Basin (NV)	15c	L	L	L	Y	Y	Y	L	L	Y	Y	Y	Y		NV/CA
Quinn Canyon Range (NV)	16	Y			Y	Y	Y			Y	Y	Y	Y		NV/CA
Warm Springs Valley (NV)	30	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	NV/CA
East Central (ID)	18	Y	L	Y	L	Y	L	Y		Y	Y		L		ID/SW MT
Snake-Salmon-Beaverhead (ID)	23		L	L	Y	L	Y	Y		L	Y	Y	L		ID/SW MT
Weiser (ID)	25	Y	L	L	L	L	Y	Y		L	Y		L	L	ID/SW MT
Sawtooth (ID)	27	Y	L		L	U	L			Y	Y		L		ID/SW MT
Southwest Montana (MT)	19-22		L		L	L	Y	L	L	L	Y		L	L	ID/SW MT

1.3 Early GRSG Conservation

The BLM manages the majority of the GRSG habitat on Federal lands (i.e., the range of GRSG not including the Columbia Basin or Bi-State Distinct Population Segments). Efforts to conserve the habitat of this species by the BLM and other wildlife conservation agencies and organizations ~~did not begin with the 2011 BLM's National GRSG Planning Strategy, but rather,~~ have been ongoing for many years.

The Western Association of Fish and Wildlife Agencies (WAFWA) 2004 *Range-wide Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats* was the first range-wide assessment of GRSG using the vast amount of population data collected over the previous 60 years, habitat information spanning the previous 100 years, and literature dating back 200 years. The goal of the assessment, contributed to by the BLM, was to present an unbiased and scientific documentation of dominant issues and their effects on GRSG populations and sagebrush habitats. http://sagemap.wr.usgs.gov/docs/Greater_Sage-grouse_Conservation_Assessment_060404.pdf

In November 2004, the BLM released its *National Sage-Grouse Habitat Conservation Strategy*, which encouraged GRSG habitat conservation through consultation, cooperation, and communication with WAFWA, the U.S. Fish and Wildlife Service (FWS), the Forest Service, the U.S. Geological Survey (USGS), State wildlife agencies, local GRSG working groups, and various other public and private partners.

In 2006, WAFWA completed a *Greater Sage-Grouse Comprehensive Conservation Strategy*, with the assistance of the BLM, the Forest Service, and other contributors. The overall goal of the Strategy was to maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain those populations. The Strategy outlined the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of GRSG and the landscapes and habitats upon which they depend. The catalyst for this effort was widespread concern for declining populations and reduced distribution of GRSG. http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf

In 2008, the BLM created two national teams to investigate possible BLM management options for GRSG conservation as well as summarizing BLM's ongoing conservation efforts. A product of this effort was one of the first range-wide priority habitat maps for GRSG that were referred to as "key habitat". At the time, the primary purpose for the key habitat map was to inform and help prioritize fire suppression efforts in GRSG habitat on BLM lands. An additional outcome of this team was the signing of a Memorandum of Understanding by the WAFWA; the BLM, FWS, USGS in the Department of the Interior; and the US Department of Agriculture Forest Service and NRCS, to provide for cooperation among the participating state and federal land managers and wildlife management and science agencies in the conservation and management of GRSG sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States and Canada. http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/fish__wildlife_and/fwp.Par.95958.File.dat/SagegrouseMOU.pdf

In 2010, BLM commissioned an effort to map breeding densities of GRSG across the West. A conference was convened with the state wildlife agencies to get approval and to coordinate the lek survey data needed for this effort. This modelling project, through an agreement with the FWS, mapped known active leks across the West. This model served as a standard starting point for all states to identify priority habitat.

http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/sage-grouse-conservation/bird_density.print.html

In March 2010, the US Fish and Wildlife Service (USFWS) published their 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 Federal Register 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, the species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 Federal Register 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM and Forest Service as conservation measures in land use plans.

1.4 National Greater Sage Grouse Planning Strategy

Based on the identified threats to the GRSG, especially inadequate regulatory mechanisms, and the FWS's timeline for making a listing decision on this species, the BLM recognized the need to incorporate explicit objectives and adequate conservation measures into RMPs by 2015 to conserve GRSG habitat and avoid the need to list the species under the Endangered Species Act. In August, 2011, the BLM chartered a planning strategy to evaluate the adequacy of BLM RMPs and address revisions and amendments throughout the range of the GRSG (with the exception of the bi-state population in California and Nevada, and the Washington state distinct population segment, which were addressed through other planning efforts). This Charter established the teams, team membership, and team operating procedures for the BLM's National GRSG Planning Strategy. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms through RMPs to conserve and restore the GRSG and its habitat on BLM-administered lands on a range-wide basis for the long-term (Figure C).
http://www.blm.gov/style/medialib/blm/wo/Communications_Directorate/public_affairs/sage-grouse_planning/documents.Par.2415.File.dat/Final%20Signed%20GSG%20Planning%20Strategy%20Charter.pdf

Two national teams and numerous other studies were used to help inform the planning efforts. The GRSG National Technical Team (NTT), comprised of BLM, FWS, USGS, NRCS, and State specialists, completed A Report on National Greater Sage-Grouse Conservation Measures in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats in the FWS listing action (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones (Figure 1-4). The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and

emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. ~~These WAFWA Management Zones are identified on **Figure 1-4** below.~~ http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

In 2012, FWS convened the Conservation Objectives Team (COT) of state and federal representatives to produce a peer-reviewed report which identified the principal threats to GRSG survival -- based upon the FWS 2010 listing decision -- and the degree to which these threats need to be reduced or ameliorated to conserve the GRSG so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future.[1] The COT report also identified Priority Areas for Conservation (PACs) and emphasized that "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". Finally, the COT report identified present and widespread, as well as localized threats by GRSG population across the West. These population specific threats, as specified from the COT report, are outlined in **Table 1-2**. **Figure 1-4** from the COT Report identifies the PACs, GRSG populations (and their names), and WAFWA Management Zones across the West.
http://www.fws.gov/greatersagegrouse/documents/COT-Report-with-Dear-Interested-Reader-Letter.pdf

[Insert **Figure 1-4** - GRSG Priority Areas for Conservation, Populations (and names), and WAFWA Management Zones.]

Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the ARMPAs.

To adequately address the reasons for the 2010 "warranted" determination by the FWS – and specific threats summarized in the COT report -- it was clear to the BLM that additional regulatory measures on federal public lands would be necessary to deal with present or threatened destruction, modification, or curtailment of habitat or range. These measures would need to be incorporated into land use plans that guide management actions on lands within the remaining range of the GRSG administered by the agencies to conserve GRSG such that listing under the ESA was no longer necessary.

In December 2011, the BLM published a Notice of Intent to prepare EISs and Supplemental EISs to incorporate GRSG Conservation Measures into Land Use Plans (LUPs) across the range of the species. A total of 15 sub-regional planning efforts (resulting in eight ARMPAs and nine ARMPs) would amend or revise 78 BLM RMPs ~~and 20 Forest LRMPs~~ across the range of the species.

The federal public land planning strategy reflected several key concepts:

- **Landscape-level**: The planning effort focused on the remaining habitat of the GRSG on public lands, covering 10 western states in the Great Basin and Rocky Mountain regions.
- **Best Available Science** – The ARMPAs/ARMPs are grounded in the best available science, drawn from published literature and input from recognized experts, state agencies, the US Geological Survey, the FWS and other sources. The COT report provided a "blueprint" for GRSG conservation by identifying specific threats to each remaining GRSG population and recommending measures to address each category of threat and the NTT report, prepared by the BLM, provided options for dealing with the most significant threats to the GRSG. A series of reports on how to improve efforts to reduce the threats of rangeland fire and invasive species prepared in collaboration with the Western Association of Fish and Wildlife Agencies also provided crucial guidance in formulating the conservation strategy.

Comment [KK22]: In this section we go back to talking about the whole planning area, not just the ARMPAs for Great Basin. Is this necessary? If it is, is it clear to the average reader that we have made that transition & what the difference is between ARMPA and ARMP?

---

[1] The Conservation Objectives Team (COT) report was prepared with the encouragement of the members of the Sage Grouse Task Force, chaired by former Secretary of the Interior Ken Salazar and Governor Meade of Wyoming and Governor Hickenlooper of Colorado.

- **Targeted, Multi-Tiered Approach** – The ARMPAs/ARMPs were designed to incorporate a layered management approach to avoid or minimize additional surface disturbance in the most valuable habitat, known as Priority Habitat Management Areas (PHMA), which are largely consistent with PACs identified in the COT Report. Within PHMA, the ARMPAs/ARMPs provide an added level of protection to limit or eliminate new surface disturbance through the delineation of Sagebrush Focal Areas (SFA), derived from areas identified by the FWS as "strongholds" essential for the species' survival. In General Habitat Management Areas (GHMA), the ARMPAs/ARMPs seek to minimize disturbance while providing greater flexibility for land use activities.
- **Coordinated**: The BLM ARMPAs/ARMPs were developed through a joint planning process led by the BLM with the Forest Service as partners. The USFWS provided guidance and input throughout the process to aid land managers in understanding the threats and the certainty and effectiveness of proposed land management actions in addressing those threats. The USGS and NRCS also provided key technical and scientific support.
- **Collaborative**: The ARMPAs/ARMPs reflected the input of states and local stakeholders from the outset and were developed with the benefit of input from the individual states and cooperators who signed formal agreements with the BLM to provide input into the planning process. The Western Governors Association Sage Grouse Task Force (SGTF), which is discussed below, was particularly useful in facilitating this kind of collaborative input. The ~~proposed LUPs~~ ARMPAs/ARMPs reflect state and stakeholder developed approaches and economic priorities where consistent with conservation objectives.

Most states across the range provided recommendations for the management of the BLM lands in their state to conserve GRSG. In all cases, this input was incorporated into the range of alternatives analyzed in the Final EISs. Components of these state recommendations were used to develop the ARMPAs/ARMPs where consistent with conservation objectives.

In addition, the ~~Western Governors Association Sage Grouse Task Force~~SGTF was established in 2011 to identify and recommend state and federal conservation actions necessary to preclude the need for the GRSG to be listed under the ESA. This group, which includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, US Forest Service, US Geological Survey, and the Department of the Interior, played an integral role throughout this land use planning process.

1.5 Addressing Threats to the Greater Sage-Grouse through the ARMPAs~~s~~

The 2006 WAFWA *Greater Sage Grouse Comprehensive Conservation Strategy* stated goal for management of the GRSG was to "maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain these populations".[2] The NTT report also endorsed this goal "as a guiding philosophy against which management actions and policies of BLM should be weighed"[3] And, in establishing the COT, with the backing of the SGTF, FWS Director Dan Ashe affirmed the commitment to the goal for GRSG conservation originally articulated in the 2006

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[2] WAFWA 2006 Strategy. The 2006 objectives built on an initial framework and commitment made by the WAFWA directors, the BLM and the FWS in 2000 with the signing of an interagency sagebrush/sage-grouse conservation MOU.

[3] Sage-grouse National Technical Team. "A Report on National Greater Sage-Grouse Conservation Measures". December 21, 2011.

WAFWA report -- reversing negative population trends and achieving a neutral or positive population trend -- and emphasized the following,

> "The Service interprets this recommendation to mean that actions and measures should be put in place now that will eventually arrest what has been a continuing declining trend. Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."7

Comment [JRL23]: Need to check footnotes – these do not run in order in present draft

Formatted: Highlight

The COT Report emphasized the need to avoid or minimize additional disturbance in GRSG habitat. Specifically, the COT stated, "[m]aintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation". To achieve this, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT emphasized an "avoidance first strategy" and stressed that threats in GRSG habitat "must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

The ARMPAs/ARMPs were developed to remove or reduce identified threats to the species and are an essential component of the effort to conserve GRSG and avoid a listing of the species under ESA. Across ten western States, the Great Basin and Rocky Mountain sub-regional ARMPs/ARMPAs contain updated land use plan direction on approximately 50 percent of the remaining habitat for the species. These ARMPAs/ARMPs are the product of extensive coordination between the BLM and the Forest Service and the active engagement of the USFWS in helping to inform land allocation and related management decisions by the BLM. The plans also benefit from strong collaboration with the states and reflect the unique landscapes, habitats, and circumstances in each.

Comment [KK24]: Why is SGTF 11 if this is 10 – Washington state is included?

Comment [JRL25]: I DON'T LIKE THIS NUMBER. WE HAVE BEEN SAYING WE MANAGED NEARLY 60% OF THE REMAINING HABITAT FOR SOME TIME. WE SHOULD NOT BE CHANGING THE NUMBERS NOW UNLESS OR ORIGINAL ANALYSIS WAS WRONG!

KK: we did change to 50% in the landscape report, so this is consistent with that. Did we use something like this in the FEISs?

~~Designation of~~ Habitat Management Areas

Comment [MEM26]: Let me know if you think I need to integrate this into this section better. I think it flows ok now.

Comment [JRL27]: THIS SECTION DEALS WITH MORE THAN "DESIGNATION" SO I SUGGEST THE MODIFICATION NOTED.

In order to protect the most important GRSG habitat areas, the conservation strategy began with mapping areas of important habitat across the remaining range of the GRSG and within each state. In collaboration with state fish and wildlife agencies, the BLM identified areas as preliminary priority habitat ~~(PPH)~~ and preliminary general habitat ~~(PGH)~~. Maps were revised and refined as further mapping was conducted and state fish and wildlife agencies – often in collaboration with GRSG experts and researchers – provided more detailed analysis of habitat characteristics and populations. The ARMPAs reflect this input and have generally aligned these habitats with Habitat Management Areas in the ARMPAs. GRSG habitat management areas on BLM-administered lands in the decision area consist of lands allocated as Priority Habitat Management Areas (PHMA) which largely coincide with Priority Areas for Conservation in the COT report, General Habitat Management Areas (GHMA), Other Habitat Management Areas (OHMA, applicable only to the Nevada and Northeastern California), and Important Habitat Management Areas (IHMA, applicable only to Idaho). **Table 1-4** identifies surface acres of PHMA, GHMA, OHMA, and IHMA in the decision area for the Great Basin Region.

PHMA, GHMA, OHMA, and IHMA are defined as follows:

- **PHMA**— BLM-administered lands identified as having the highest value for~~to~~ maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries identified in the Draft LUPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.

- **GHMA**— BLM-administered lands where some special management would apply to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries identified in the Draft RMP/EIS.
- **OHMA** —BLM-administered lands ~~only~~ in Nevada, identified as unmapped habitat in the Proposed RMP/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California; Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.
- **IHMA** —BLM-administered lands in Idaho that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. ~~There are no IHMAs designated within southwestern Montana.~~ The IHMA boundaries and management strategies are derived from and generally follow the Preliminary Medial Management Area (PMMA) and Important Habitat Zone (IHZ) boundaries identified in Alternatives D and E, respectively, of the Draft LUPA/EIS, but may be modified based on the objectives of each alternative. These lands serve a critical role in the adaptive management strategy developed by the State of Idaho and adopted in the ARMPA.

Table 1-4

Surface Acres of PHMA, GHMA, OHMA, and IHMA in the Decision Area for the Great Basin Region

BLM administered surface acres	PHMA	GHMA	OHMA	IHMA
Idaho and Southwestern MT	4,627,200	2,179,700	0	2,737,600
Utah	2,023,400	502,500	0	0
Oregon	4,547,000	5,660,150	0	0
Nevada and Northeastern CA	9,309,700	5,720,600	5,876,600	0
Total Acres	**20,507,300**	**14,062,950**	**5,876,600**	**2,737,600**

Source: BLM GIS 2015

The ARMPAs also identify Sagebrush Focal Areas (SFAs) on a portion of the landscape. SFAs are a subset of PHMAs (see **Figure 1-3** - Great Basin Region Decision Area - Greater Sage-Grouse Habitat Management Areas). Across the Great Basin Region, there are 9,076,948 acres of BLM administered SFAs. SFAs correspond to the areas identified by the FWS as GRSG "strongholds" as detailed in an October 27, 2014 memorandum from the FWS Director to BLM Director and Forest Service Chief in response to a request to "identify a subset of priority habitat most vital to the species persistence within which we recommend the strongest levels of protection". (http://www.fws.gov/greaterSageGrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf)

This tiered habitat framework provides for a nested or layered conservation design with the goal of providing the greatest ~~protections~~ protections for habitat in PHMAs achieved through: ~~and~~ ~~(1)~~ the strongest limits ~~ed~~on- new surface disturbance – ~~achieved through~~such as (1) no surface occupancy with limited exceptions for fluid minerals development, (2) exclusions (with limited exception) for wind and solar development, (3) avoidance for new rights of way, (4) closures for saleable mineral, with limited exceptions, (5) -priority protection from rangeland fire~~, (6) priority for habitat~~

~~restoration~~, (7) accelerated efforts to reduce grazing impacts from free-ranging equids, and (7) priority review for compliance with cattle grazing standards for public land allotments, as well as priority for habitat restoration. ~~in SFAs,~~

These conservation prescriptions for the PHMAs provide a high degree of certainty that the integrity of PHMAs can be maintained through management decisions to avoid or minimize additional surface disturbance. In SFAs, maximize protection from new surface disturbance would be achieved by (1) requiring NSO without exceptions for fluid minerals, (2) additional limits on disturbance from mining and related activity by recommending- withdrawal from new hardrock mining claims~~,~~for areas of PHMA not already closed to hardrock mining, ~~and a commitment to reduce wild horse and burro populations to Appropriate Management Levels (AML) by 2020~~. Given the “existing high quality sage brush habitat for sage grouse … and highest breeding densities of sage grouse” in the SFAs, or strongholds, as identified by the FWS, the decision to recommend withdrawal of SFAs from future hard rock mining is consistent with the COT recommendation to “Avoid new mining activities and/or any associated facilities within occupied habitats, including seasonal habitats; and avoid leasing in sage-grouse habitats until other suitable habitats can be restored to habitats used by sage-grouse.”

~~p~~
Protection of remaining habitats in GHMAs would be managed consistent with the COT report recommendation -to recognize “that important habitats outside of PACs be conserved to the extent possible”. ~~,~~Thus, land allocations and management prescriptions for lands in GHMAs provide for ~~with~~ more flexibility for land use activities that would be designed to minimize impacts on existing GRSG leks. In all GRSG habitat management areas, anthropogenic surface disturbing activities would be mitigated, and degraded landscapes, due to fire or other causes, would be actively restored and protected. ~~with a priority on SFAs, then PHMAs, and then GHMAs~~. The combination of habitat classifications and land allocation decisions in the ARMPAs will provide the greatest protection for those areas identified as SFAs and meet the stated objective for these areas “where it is most important that the BLM and Forest Service institutionalize the highest degree of protection to help promote persistence of the species.”

Major components of the attached ARMPAs ~~developed to~~that address the specific threats to the viability of the GRSG, as identified in the USFWS 2010 listing decision and COT r~~R~~eport (many of which were also identified by the BLM’s NTT Report) are listed in **Table 1-3** and summarized below. Throughout the ARMPAs, a particular focus is placed on an “avoidance first strategy” as emphasized in the COT report by limiting new disturbance and maintaining current intact GRSG habitat. This avoidance first strategy is accomplished through identification and allocation of important GRSG habitat and excluding or avoiding surface disturbing activities, appropriately managing grazing, and aggressively suppressing fire that could degrade or fragment remaining GRSG habitat. The plans also include decisions to restore degraded habitat, which although more difficult and requiring a longer time frame, is important to the long-term viability of GRSG. Restoration decisions include specific habitat objectives, and a priority on treating GRSG habitat for invasive species, particularly cheatgrass, and encroaching pinyon and juniper. These decisions are reinforced by Secretarial Order 3336 and the *Integrated Rangeland Fire Management Strategy* which provide a framework, specific actions, and Department-wide priority on managing Federal lands, particularly in the Great Basin, to protect and restore sagebrush-steppe habitat.

Comment [KK28]: Moved this down because the rest are surface disturbance, this is not.

Comment [KK29]: This new text is covered in the sections below about surface protection & habitat improvement – this section was supposed to be just about the designations, to provide context for the next sections. By moving it all up here, should we delete all following sections?

Comment [JRL30]: Correctly characterized?

Comment [KK31]: This is not an RMP thing so should not be included.

Comment [KK32]: I recommend moving all of this down to the surface disturbance section

Comment [KK33]: ?? is this correct

Comment [KK34]: Just to confirm, IHMA & OHMA are never part of this hierarchy?

Comment [KK35]: JL has deleted this, not sure why because it seems pertinent to explain the hierarchy.

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
All threats	• Implement an Adaptive Management Strategy, which allows for more restrictive management to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG and its habitat. • Monitor implementation and effectiveness of conservation measures in GRSG habitats in a consistent manner. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDFs) when authorizing actions that affect GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development.	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit and proposed project analysis areas in PHMA (slight variations to this management component in the State of Nevada only) • PHMA: Apply a disturbance density cap of 1 facility per 640 acres (except in the State of Nevada)
Energy development—fluid minerals, including geothermal resources	• PHMA: Open to fluid mineral leasing subject to a No Surface Occupancy (NSO) stipulation without waiver or modification, and with limited exceptions. In SFAs, a NSO stipulation would be applied without waiver, modification, or exception. In Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for authorization if certain criteria is met. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) and Timing Limitation (TL) lease stipulations (except in the State of Utah where some portions of GHMA are open with standard lease stipulations)
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Avoidance area (may be available for wind energy development with special stipulations) (except in the States of Utah and Idaho, where these areas would open to wind energy development)
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions) (except in southeastern counties in the State of Oregon where portions of PHMA are avoidance areas) • GHMA: Exclusion area (not available for solar energy development under any conditions) (except in the States of Oregon and Montana where these areas are avoidance areas for solar energy development and the State of Idaho, where these areas would open to solar energy

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	development)
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations) • GHMA: Avoidance area (may be available for major ROWs with special stipulations) (except in the State of Utah where GHMA is open)
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals)
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFAs followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	• Prioritize gathers in SFAs, followed by other PHMAs. • Manage Herd Management Areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives. • Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of AMLs and preparation of Herd Management Area Plans in GRSG habitat.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats. • Remove livestock ponds built in perennial channels that are negatively impacting riparian habitats. Do not permit new ones to be built in these areas subject to valid existing rights.
Recreation	• PHMA: Do not construct new recreation facilities unless required for health and safety purposes.

Table 1-3
Key Components of the Great Basin Region GRSG ARMPAs that Address the COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Management Responses of the Great Basin Region GRSG ARMPAs
	• Allow special recreation permits only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. • PHMA & GHMA: OHV use limited to existing routes (routes to be designated through future travel management planning)
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in SFAs, other PHMAs and GHMAs.
Nonnative, invasive plant species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural conversion and exurban development	• GRSG habitat will be retained in federal management.

Comment [KK36]: Matt, I am pointing out that I added this to the table – it was in redline in the last version from me & Jim, but since I moved the table I think the whole table was redline so I just want to be sure you see it.

The ARMPAs were developed based on three range-wide objectives for conserving and protecting habitat: minimizing new and additional surface disturbances, improving habitat conditions, and reducing threats of rangeland fire to GRSG and sagebrush habitat. How the ARMPAs met these objectives is summarized below.

1.5.1 Avoid and Minimize Surface Disturbance

Allocations and Habitat Protection/Surface Disturbance Measures

Comment [KK37]: Are these subheaders needed or can we just let this section flow from paragraph to paragraph?

To avoid or minimize further surface disturbance in PHMAs the ARMPAs either close, exclude, or avoid major new surface disturbing activities. In SFAs, in addition to PHMA decisions described below and shown in **Table 1-3**, ARMPAs apply a no surface occupancy stipulation with no exceptions for oil and gas leasing and recommend these areas for withdrawal from future locatable mineral entry.

The four Great Basin ARMPAs provide land use allocations and management guidance for PHMAs to avoid new disturbance and minimize any disturbance associated with projects that might be developed in PHMA in the future. Allocations to avoid and minimize additional disturbance in PHMA include, fo~~i~~r example, the application of a no surface occupancy (NSO) stipulation associated with any future leasing and development of oil and gas in PHMAs. With the exception of a few areas in Utah and in eastern Nevada, there is low potential for fluid minerals in the Great Basin Region.

Similarly, mineral development is closed in PHMAs for non-energy leasable minerals and saleable minerals, ~~with the exception of~~but not for locatable minerals governed under the 1872 Mining Act. An exception is granted for free use permits and the expansion of existing active pits for ~~mineral~~ saleable minerals ~~material sales~~ and expansion of existing non-energy leasable development. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

Comment [KK38]: I changed this so we used the same name as the previous sentence & Table 3.

Comment [GSD39]: What is the relevance of this statement, do we not have the coal language in the other plans?

Comment [MEM40]: Because energy development is a present and widespread threat to certain populations in UT, I thin k its important to state this. We can remove if needed.

In all PHMAs in the Great Basin Region, renewable energy development (solar and wind) is excluded, with the exception of three areas in southeastern Oregon where an avoidance allocation is applied; and new rights of way and development for transmission lines, pipelines, and related infrastructure is avoided through restrictions on land use authorizations. Where the allocation is avoidance, exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs, unless the development results in a net conservation gain to the GRSG or its habitat.

Comment [GSD41]: Do we need to explain why OR is different here or somewhere else?

Comment [KK42]: Is this three areas or three counties?

Comment [MEM43]: This should be addressed in section 1.6. May need assistance with this rationale.

While restrictions on future development in PHMA are intended to avoid or minimize additional surface disturbance, restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to a controlled surface use and timing limitation stipulation rather than an NSO stipulation see **Table 1-3** for more details on GHMA management decisions. However, any disturbance is subject to mitigation and should seek to first avoid and then minimize any impacts to GRSG or its habitat, while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species. As noted in the COT report, "Conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur. …If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal , state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs."

In addition to areas where uses are closed, excluded or avoided, the ARMPAs direct the BLM to proactively prioritize oil and gas leasing and development outside of identified SFAs, PHMAs, and GHMAs in order to encourage new development in areas that would not conflict with GRSG and thus maximize the potential to limit disturbance to remaining GRSG habitat. This approach will also assist developers in reducing the time and cost associated with oil and gas leasing development by avoiding sensitive areas and decreasing the need for compensatory mitigation.

Comment [JRL44]: SHOULD WE CITE FINDINGS IN THE WEST STUDY HERE TO HIGHLIGHT HIGH AND MEDIUM OIL AND GAS POTENTIAL OUTSIDE OF HABITAT?

In general, all forms of new development would be closed, excluded, avoided, or developed only if the resultant effect is a net conservation gain to the GRSG or its habitat, assuring that existing habitat would be protected and providing opportunities through compensatory mitigation to restore degraded habitats. This is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0*, published by the FWS in September 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse." In all instances, whether in PHMA or GHMA, any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation gain for the GRSG.

In addition to major surface disturbing activities such as energy and infrastructure development, the ARMPAs address other identified threats~~activities~~, including improper livestock grazing, wild horses and burros overuse ~~management~~, and recreation. Grazing is the most widespread use of the sagebrush steppe ecosystem in the Great Basin Region. The COT r~~R~~eport recommendation for grazing states, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage- grouse (e.g. shrub cover, nesting cover)." To ensure that grazing continues in a manner consistent with the objective of conserving the GRSG and its habitat, the four Great Basin ARMPAs require the incorporation of GRSG seasonal habitat objectives into grazing permits, consistent with the ecological site potential of the local areas, prioritize the review and monitoring of grazing permits, and take numerous actions to avoid and minimize the impacts of range management structures (see **Table 1-3**).

To address the localized threat due to negative influences of grazing by free-roaming equids (wild horses and burros (WHB)), the BLM will focus on meeting and maintaining WHB Herd Management Areas in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives, including completing rangeland health assessments, prioritizing gathers and population growth suppression techniques, and developing or amending Herd Management Area plans to incorporate GRSG habitat objectives and management considerations. In SFAs and PHMA, the BLM will assess and adjust AMLs through the NEPA process within HMAs when WHBs are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.

Comment [KK45]: Don't think we can just say maintaining since most are currently over AML

Comment [JRL46]: Should we make note of commitment to bring all SFAs to AML by 2020?

Comment [MEM47]: The 2020 deadline is not mentioned as a management action in the ARMPAs. The language as presented is within all 4 ARMPAs.

To ameliorate the threat from recreational activities, new facilities or expansion of existing facilities (e.g., roads, trails, campgrounds) will not be authorized in PHMA unless the development results in a net conservation gain to GRSG its habitat. In PHMA and GHMA travel would be limited to vehicle routes. Initially, vehicles would be limited to existing routes until implementation travel management planning could be completed to designate routes. Travel management plans, including route inventories, NEPA analysis, and route designation will be completed in a subsequent public planning process.

Disturbance Caps, Density Caps, and Lek Buffers

In addition to the management actions and allocations discussed in detail in the sections above, the ARMPAs limit the amount of anthropogenic disturbances in PHMAs through the use of disturbance caps, density caps and lek buffers. These elements further address threats related to surface disturbances by limiting the amount of habitat impacted and keeping resource uses an appropriate distance~~way~~ from leks. In general, disturbance caps of 3% were established in accordance with the recommendations contained in the COT report. ~~i~~If the 3% anthropogenic disturbance is exceeded on lands (regardless of land ownership) within PHMA in any given Biologically Significant Unit (BSU), no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted within PHMAs in that Biologically Significant Unit. If the disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted until disturbance in the proposed project analysis area has been reduced to be under the cap (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.). The ARMPAs have a few modifications to the disturbance cap: Oregon does not allow more than 1% new anthropogenic disturbance per decade, not to exceed 3% disturbance at any time. In Nevada, exceeding a 3% disturbance cap can occur at the BSU and/or the project level as long as the outcome results in a net conservation benefit as approved by the BLM in accordance with the process described in **Section 1.6**.

Comment [KK48]: Added a sentence to tie this section back to the threats it is addressing.

Comment [JRL49]: WHERE DO WE ADDRESS BSUs AND CALCULATION OF DISTURBANCE WITHIN BSUs? NEED TO DO SO WITH A PARAGRAPH OR REFERENCE TO A FOOTNOTE OR APPENDICE HERE.

~~Limiting Density of Disturbance~~

The ARMPAs incorporate a cap on the density of energy and mining facilities to encourage consolidation of structures and to reduce habitat fragmentation. The cap is set at an average of one facility per 640 acres in PHMA in a project authorization area, consistent with guidance contained in the NTT report. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located into an existing disturbed area, subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc. The one facility per 640 density decision does not apply to Nevada, as described in **Section 1.6**.

~~Buffering Development Impacts~~

The ARMPAs require that impacts to leks be evaluated for actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from certain activities using the lek buffer-distances as identified in the USGS Report Conservation Buffer Distance Estimates for GRSG – A Review (Open File Report 2014-1239). The lek buffer distances required vary by type of disturbance (road, energy development, infrastructure, etc.) and are fully described in Appendix X of the ARMPAs.

The lek buffer distances will be applied as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) as defined in the ARMPAs. In PHMA, if the action cannot be located outside of the buffer-distance, the BLM may approve actions in PHMAs that are within the applicable lek buffer-distance only if a different buffer distance offers the same or greater level of protection to GRSG and its habitat. In GHMAs actions may be approved within the applicable lek buffer distance only if a different distance offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations) and any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain. This approach to determining relevant lek buffer distances is consistent with the COT recommendation that "conservation plans should be based on the best available science and use local data on threats and ecological conditions."[4]

Required Design Features

Required Design Features (RDFs) and Best Management Practices (BMPs) are required for certain activities in all GRSG habitat, including PHMA, GHMA, IHMA in Idaho and OHMA in Nevada. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). RDFs and BMPs have been developed for oil and gas

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[4] COT report, p 34

development, infrastructure, range developments, and other surface disturbing activities and are fully described in Appendix X of the ARMPAs.

1.5.2 Habitat Mitigation and Restoration, Monitoring and Adaptive Management~~Improving Habitat Conditions~~

In addition to~~ improving~~ prescribing land allocations and~~-~~ managing~~ement of~~ resource uses ~~and~~ to minimize and avoid~~ing~~ further surface disturbance, the ARMPs/ARMPAs identify management actions to promote the ~~restoration and~~ mitigation and restoration ~~improvement~~ of GRSG habitat. ~~.~~ ~~The ARMPAs also describe a~~ M~~m~~itigation for habitat disturbing resource uses will ~~program, which~~ follow~~s~~ the avoid, minimize, and compensate mitigation hierarchy. ~~(See Section 5 for more information.)~~ Where compensatory mitigation is required to offset unavoidable impacts, habitat restoration activities will be developed ~~in coordination with the states,~~ to provide ~~for habitat restoration activities that produce~~ a net conservation gain for the GRSG.

During the implementation of the ARMPs/ARMPAs, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in GRSG habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation;~~ Wyoming will apply a net conservation gain standard to actions in PHMA only~~. This will be achieved by avoiding, minimizing, and compensating for unavoidable impacts by applying beneficial conservation actions to offset remaining impacts associated with the action. This standard is consistent with the recommendation included in the *Greater Sage-Grouse Range-wide Mitigation Framework: Version 1.0* published by the FWS in September, 2014, which states that mitigation "be strategically designed to result in net overall positive outcomes for sage-grouse"[5]**.** Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate) and be implemented on BLM-managed lands in a manner consistent with Departmental guidance for landscape mitigation pursuant to Secretarial Order 3330[6]. If impacts from BLM and Forest Service management actions and authorized third party actions result in habitat loss and degradation that remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.

Within 90 days of the issuance of the Record of Decisions, BLM will establish WAFWA Management Zone GRSG Conservation Team, including members from the respective states, Forest Service, USFWS, NRCS, and other local governments. This team that will develop a WAFWA Management Zone Regional Mitigation Strategy to inform the NEPA decision making process including the application of the mitigation hierarchy for BLM and Forest Service actions and third party authorizations that result in habitat loss and degradation. These regional mitigation strategies will contribute to GRSG habitat conservation by reducing, eliminating, or

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[5] USFWS. Greater Sage Grouse Range-Wide Mitigation Framework: Version 1.0. September 3, 2014.

[6] Secretarial Order 3330. Improving Mitigation Policies and Practices of the Department of the Interior. October 2013.

Comment [MEM50]: Should we add a reference to adaptive management and monitoring?

Comment [KK51]: This section did not quite flow, so I reworked it a bit

Comment [KK52]: I think this reference should stay.

Comment [KK53]: Recommend moving down to mitigation section minimizing threats and compensating for residual impacts to GRSG and its habitat~~.~~, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to help guide the conservation of GRSG. The zonal mitigation strategy will be developed within one year of the issuance of the Record of Decisions.

Comment [JRL54]: CONFUSING – ONE TEAM DEVELOPS OVERALL STRATEGY THEN TEAMS DEVELOP REGIONAL STRATEGIES? OR ONE TEAM DOES IT ALL? Why are the WAFWA zone teams as opposed to Sage Grouse Management zone teams?

KK: move to mitigation section

~~In addition to improving management of resource uses and avoiding further surface disturbance, the ARMPAs identify management actions to promote the restoration and improvement of GRSG habitat, Decisions related to improving and restoring habitat particularly addressing the threats of invasive species, pinyon and juniper expansion, as well as climate change. As with the management of uses, habitat management, restoration, and improvement action is prioritized first in SFAs, followed by PHMA, and then GHMA.~~

Comment [KK55]: Need to get the hierarchy of SFA, PHMA, GHMA into this section somewhere

~~The~~ARMPs/ ARMPAs ~~also~~ specify habitat objectives necessary for GRSG, used both to evaluate grazing and wild horse and burro management and for restoration purposes. These habitat objectives were developed for each of the GRSG's life history stages based on the ecology within each ARMPA's sub-region. These objectives will be used to meet the applicable land health standard in GRSG habitats. They also include maintaining a minimum of 70% of lands capable of producing sagebrush with 10-30% canopy cover, and address species richness and composition, as well as meeting land health standards considering the ecological potential for the site. ~~These habitat objectives are a core component of the adaptive management and monitoring strategy (see section 6 for more information). The ARMPA adaptive management and monitoring strategy provides for specific monitoring of GRSG and its habitat. The data collected is used to evaluate the effects of authorized uses, restoration, and other activities to determine if unexpected impacts to GRSG are occurring that require changes to management to meet the objectives.~~

Comment [JRL56]: DOESN'T WORK FOR ME!

Comment [KK57]: Tying adaptive management and monitoring to this section . . .

The ARMPAs also include specific decisions to improve habitat conditions and meet the habitat objectives related to treatment and removal of invasive annual grasses and the removal of encroaching pinyon juniper in SFA, PHMA, and GHMA, and restoration of degraded landscapes, including those impacted by fire events. ~~and post-fire restoration.~~

The COT identified wildfire and conversion of sagebrush habitat to invasive annual grass-dominated vegetative communities as two of the primary threats to the sustainability of GRSG in the Western portion of the species range (i.e., the Great Basin). The proposed LUPs contain a framework that provides a consistent approach to conduct assessments to identify priority habitat areas and management strategies to reduce the threats to GRSG resulting from impacts of invasive annual grasses, wildfires, and conifer expansion (FIAT 2014). To assist in addressing these threats, the Fire and Invasive Assessment Tool (FIAT) was developed to assess the major threats to the sagebrush-steppe in order to conserve the GRSG and its habitat. The purpose of the FIAT is to identify priority habitat areas and management strategies to reduce the threats to GRSG resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The FIAT is a process that uses the best available information from many disciplines including ecology, biology, soils, fire science as part of a strategic framework. The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers, et al., 2014b). The final FIAT process report was completed in June 2014 by the Fire and Invasive Assessment Team. The BLM, the Forest Service, and FWS agreed to incorporate this approach into the final GRSG EISs. The FIAT is also a key element of the

Integrated Rangeland Fire Management Strategy, identifying focal areas for priority actions in fire and fuel management.

The FIAT process:

- Identifies important GRSG occupied habitats and baseline data layers to define and prioritize GRSG habitats.
- Assesses their resistance to invasive annual grasses and resilience after disturbance.
- Prioritizes focal habitats for conservation and restoration.
- Identifies geospatially-explicit management strategies to conserve GRSG habitats.

BLM ARMPs/ describe goals, objectives, and management actions ~~and Forest Service LRMPs describe desired conditions, objectives, standards, and guidelines~~ to conserve GRSG, but do not provide specificity related to project prioritization, extent, and location, which is information important to the 2015 FWS listing decision. As such, FIAT products, in conjunction with the Integrated Rangeland Fire Management Strategy, fulfill a key role by providing quantified descriptions of future conservation actions to inform the GRSG listing decision to increase the efficacy of fire management efforts.

Comment [KK58]: This should probably be largely moved to the fire section below. Although invasive species treatments & PJ removal are not limited to fire priority areas, so I think some of that discussion still belongs here.

~~Also important to responding to the threat of fire and invasive plant species is the FWS-sponsored project with WAFWA that assembled an interdisciplinary team to provide additional information on wildland fire and invasive plants and developed strategies for addressing these issues. (Mayer et al, 2013) The FWS-sponsored project is based, in part, on NRCS soil surveys that include geospatial information on soil temperature and moisture regimes associated with resistance and resiliency properties. While this assessment is applicable across the range of GRSG, the analysis is limited to WAFWA GRSG Management Zones III, IV, and V (roughly the Great Basin region) because of the significant issues associated with invasive annual grasses and the high level of wildfires in this region.~~

Comment [KK59]: Not pertinent to the BLM ROD??

With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that inform that ARMPAs and supported the development of the *Integrated Rangeland Fire Management Strategy* are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.

The COT noted that "a monitoring program is necessary to track the success of conservation plans and proactive conservation activities. Without this information, the actual benefit of conservation activities cannot be measured and there is no capacity to adapt if current management actions are determined to be ineffective." The ARMPAs monitoring strategy has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can answer questions about how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of ARMPAs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for ARMPA effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.

Each proposed LUP includes an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored - habitat loss and/or population declines.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the proposed ~~LUPs~~ARMPAs, the BLM ~~and Forest Service~~ response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each proposed LUP, a soft trigger begins a dialogue between the state, FWS, and the BLM ~~or Forest Service~~ to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines). Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM ~~and Forest Service proposed LUPs~~ARMPAs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ~~and Forest Service proposed LUPs~~ARMPAs, the BLM ~~and/or Forest Service~~ will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the ~~proposed LUPs~~ARMPAs.

Comment [KK60]: This whole section needs to move to the monitoring & adaptive management section below – as I understand it from Matt, this needs to be its own section in the ROD.

~~With regard to the threat of climate change, the proposed ARMPAs set goals and objectives and describe actions intended to build resilience in the sagebrush steppe landscape to the impacts of climate change through habitat conservation and restoration measures. The coordinated landscape approach to addressing rangeland fire and invasive species described in the *Integrated Rangeland Fire Management Strategy* will further this effort. The Fire and Invasives Assessment Team (FIAT) assessments that inform that ARMPAs and supported the development of the *Integrated Rangeland Fire Management Strategy* are specifically designed to identify landscapes of high resistance and resilience based on research by Chambers (Chambers et al, 2014b). Additionally, by limiting or eliminating anthropogenic surface disturbance, especially in the SFAs, ensuring the integrity of the PHMAs, and restoring habitat through~~

~~fuels management, post-fire restoration, and mitigation efforts, connectivity and availability of sagebrush habitat are expected to increase thus contributing to increased climate resilience.~~

1.5.3 Reducing Threats of Rangeland Fire to GRSG and Sagebrush Habitat

The COT emphasized that " rangeland fire ~~o~~ (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency". For this reason, the ARMPAs ~~ameliorate the threat from fire, the ARMPs~~ seek to fight the spread of cheatgrass and other invasive species, position wildland fire management resources for more effective rangeland fire response, and accelerate the restoration of fire-impacted landscapes to native grasses and sagebrush. Prescribed fire will not be used unless necessary to facilitate site preparation for restoration of GRSG habitat. The BLM *Greater Sage Grouse Invasive Annual Grasses & Conifer Expansion Assessment* (FIAT 2014) modeled conifer expansion for PACs to provide an initial stratification to determine where conifer removal would benefit important sagebrush habitats. This information is being used to identify and design projects to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity due to invasive grasses and conifer encroachment. Consistent with this assessment, the BLM ARMPAs include management actions to remove invading conifers and other undesirable species, and prioritize vegetation treatments closest to occupied GRSG habitats and near occupied leks. Through guidance in the proposed ARMPAs supplemented by the *Integrated Rangeland Fire Management Strategy*, a commitment has been made to address the invasion and expansion of cheatgrass, medusa head, and other invasive grasses through expanded efforts to treat impacted acres and to accelerate and expand efforts to restore lands impacted by fire with native grasses and sagebrush seedlings. Efforts are underway to increase the acreages to be treated with chemical and biological agents to kill and stem the spread of invasive species and to accelerate the registration of other biologicals useful in addressing the threat of cheatgrass invasion.

In addition to and complementing the ARMPAs described in this ROD, Secretarial Order 3336 on Rangeland Fire made clear that "**protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, priority GRSG habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department".** (emphasis added) The strategy places a Departmental priority on activities to prevent, suppress, and restore fire-impacted landscapes in areas identified by the Fire and Invasives Assessment Tool (FIAT) in priority habitat, using recent information derived from a report prepared by WAFWA to assist in addressing the threat of rangeland fire. The FIAT process, applying recent science, identified highly resistant and resilient landscapes to target fire management activities to these most important lands. In addition, through the issuance of a Leaders' Intent letter, signed by the Secretaries of Agriculture and the Interior, rangeland fire was identified as an "additional priority" for the firefighting community in making strategic decisions with regard to the allocation of resources for firefighting in 2015. Additional resources have been allocated and will be targeted to fuel treatments (including invasive species control), suppression (through the prepositioning of fire-fighting resources and the training of additional Rural Fire Protection Associations, local volunteer firefighters, and veteran fire fighters), and habitat restoration in these areas. Firefighting assets (aircraft, firefighters and related equipment) will be located near areas of high priority for rangeland fire.

1.6 Unique Aspects of the Great Basin ARMPAs

Comment [MEM61]: Still need input from Sarah G here related to the rationale as to why these differences exists.

The ARMPAs and their associated environmental impact statements were developed through four ~~separate~~ planning efforts across the Great Basin Region (as described in **Section 1.1**). A landscape approach was used to create cohesive management across the range of GRSG, while also using the subregional plans to accommodate differences in resource conditions, degree of threats, and state management approaches. ~~BLM's land use planning process is a highly collaborative process, involving local cooperating agencies, stakeholders, and members of the public. As a result of conducting four separate planning efforts, each sub-region received unique comments and feedback from their differing cooperating agencies, stakeholders, and interested members of the public. These comments were used to develop the ARMPAs and as a result, the management direction presented in each of the attached ARMPAs addresses sub-regional conditions and management. In addition, a~~As a result of the varying subregional threats, ~~that were presented to local populations~~ (refer to Table 1-2), conditions, and management, each sub-region, in collaboration with their local cooperators and considering public comments, adapted the range-wide landscape-management strategy ~~approach~~ to address these differences while ~~crafting different approaches to~~ meeting the overall ~~purposed and need~~ objective to conserve, enhance, and restore GRSG and their habitats. Below is a brief description of the unique aspects of each of the Great Basin sub-regional ARMPAs.

Idaho and Southwestern Montana

The Idaho and Southwestern Montana ARMPA adopted specific aspects of the State of Idaho's Conservation Plan for GRSG. The most ~~important varying~~significant aspect adopted from the State's plan is a third tier of habitat management area, Important Habitat Management Areas (IHMA). IHMA are BLM-administered and National Forest System lands that provide a management buffer for PHMA and connect patches of PHMA. I-HMA encompasses areas of generally moderate to high conservation value habitat and/or populations, but that are not as important as PHMA. In a landscape that is most threatened by fire and invasive species, this three-tiered approach allows land managers to focus suppression and restoration resources on those areas of highest importance while providing an acceptable additional level of flexibility in IHMA and GHMA since development is not as great a threat to habitat in the state. The three tiers ~~This three-tiered approach~~ also serve~~s~~ as the foundation for an adaptive management approach that includes habitat and population hard and soft triggers ~~in areas most valuable to the GRSG~~that when hit require ~~and the~~ shifting ~~of~~ IHMA to PHMA ~~when triggers are hit~~to maintain sufficient PHMA to support populations. The Idaho ARMPA also includes a slightly different disturbance calculation, as described in Appendix X of the attached Idaho and Southwestern Montana ARMPA. The ARMPA ~~also~~ applies land use planning allocation decisions for certain distances from leks, which is a deviation from the other Great Basin ARMPAs.

Nevada and Northeastern California

The Nevada portion of the Nevada and Northeastern California ARMPA adopts key elements of the State of Nevada Greater Sage-Grouse Conservation Plan (State of Nevada 2014) and the State of Nevada Conservation Credit System (Nevada Natural Heritage Program and Sagebrush Ecosystem Technical Team 2014) by establishing conservation measures and focusing restoration efforts in the same key areas most valuable to the GRSG. ~~Ad~~The Nevada plan allows for an exception to geothermal NSO which is an energy development priority for the state and is projected to create very limited disturbance in predictable areas over the life of the plan. For those reasons, after conversation with the USFWS, the BLM determined that this exception is consistent with overall conservation objectives. The ARMPA also adopts a Disturbance Management Protocol (DMP) to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, State of Nevada, and FWS. The plan provides for this exception due to unique factors in Nevada including the lower threat posed by development versus fire and invasive species, the extremely

Comment [JRL62]: THESE NEED TO BE INCLUDED AS APPENDICES TO THE ROD TO MAKE IT EASIER TO READ THE ROD AS A COMPLETE DOCUMENT.

KK: they will be attached to the ROD as appendices to each RMP.

Comment [KK63]: I think we should be more explicit about this & state clearly how it differs; this sentence is a bit opaque

Comment [JRL64]: What does this mean?

Comment [KK65]: GSD: don't know how to explain different disturbance calculation & allocation buffers.

Comment [KK66]: GSD: BLM needs to explain why we made limited use of CCS

Comment [KK67]: The list from Stephanie also included :unique disturbance approach – is that different from the DMP? If it is, GSD: BLM needs to explain limited nature of certain habitat types (including wet meadows and riparian areas) located mostly on private land, and the development of strong mitigation tools in the state which may make disturbance on publicly-managed PHMA along with protection for higher value habitat in the conservation interest of the species under certain circumstances. Given those factors and the procedural protections in place, the BLM determined that this approach is consistent with conservation objectives.~~ditionally, other unique aspects of the Nevada and Northeastern California ARMPA includes an NSO exception to geothermal leasing and development and a separate Disturbance Management Protocol (DMP) that is intended to provide for a 3% limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species, with concurrence from the BLM, State of Nevada, and FWS~~. The Nevada and Northeastern California ARMPA also does not have density cap, which is present in the three other Great Basin Region ARMPAs.

Utah

The Utah ARMPA adopts the key elements of the GRSG conservation plans or directives developed by the State of Utah (Conservation Plan for Greater Sage-Grouse in Utah) and the State of Wyoming (Executive Orders 2011-05 and 2013-3), which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas deemed most valuable to GRSG. Additionally, within GHMA, the Utah ARMPA allows for wind energy and high voltage transmission ROW development (consistent with the mitigation framework for the ARMPA), as well as oil and gas development, which is open with standard constraints. The ARMPA provides additional flexibility for development in GHMA because 95% of the breeding GRSG in Utah are within PHMAs and understanding appropriate protections such as lek buffers and required design features will be analyzed and applied at the project-implementation stage. Because there is no potential for coal development in the Great Basin Region outside of Utah, only the Utah ARMPA addresses this threat. In Utah, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

Oregon

The Oregon ARMPA adopts key elements of the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Hagen 2011) which establishes unique conservation measures for protecting GRSG and also focuses restoration within key areas most valuable to GRSG. In addition, the BLM plan adopts the unique disturbance cap approach developed by the state in which disturbance is capped at 1% per decade. The BLM Oregon plans provide additional flexibility for wind development in PHMA in the three counties that have SFAs by allowing for avoidance rather than exclusion in that part of PHMA that is outside of the SFAs. The BLM adopted this flexibility after coordination with the USFWS because of the priority the State of Oregon has placed on wind development in conjunction with the more rigorous disturbance cap approach and adaptive management triggers adopted by the Oregon plan. Avoidance for solar and wind in three SE counties in PHMA. Due to these factors, the BLM finds these limited areas of flexibility for wind development are consistent with overall conservation objectives.~~Also, three areas in southeastern Oregon within PHMA are not designated as exclusion areas to solar and wind energy development, but are instead avoidance areas to these types of development. This exception would not apply to areas designated as SFAs in this portion of southeastern Oregon.~~

Comment [JRL68]: NEED TO EXPLAIN AND JUSTIFY –OTHERWISE MIGHT SEEM "ARBITRARY AND CAPRICIOUS"

KK: see revised text from GSD

Comment [JRL69]: NEED TO EXPLAIN WHY; GSD: BLM needs to explain

Comment [KK70]: Stephanie's list included "updated map" GSD: BLM must explain

Comment [JRL71]: NEED TO CLARIFY – PERMITTED BY THE MITIGATION FRAMEWORK OR REQUIRING MITIGATION CONSISTENT WITH THE FRAMEWORK?

Comment [KK72]: Stephanie's list included: allocation/habitat exception language for GHMA – if that is different from what is here, GSD: BLM should explain

Comment [JRL73]: NEEDS CLARIFICATION

Comment [KK74]: JL: need to name the 3 counties

Comment [JRL75]: YES, NEED TO NAME

[SUGGEST INSERTION OF A SUMMARY TABLE HERE FROM THE LANDSCAPE REPORT THAT SHOWS DIFFERENCES BETWEEN OVERALL REGIONAL DIRECTION AND STATE-SPECIFIC MODIFICATIONS TO REGIONAL DIRECTION FOR THE 4 SUBREGIONAL PLANS!!!]

Formatted: Font: 14 pt, Bold

1.7 Summary of the BLM's National GRSG Planning and Conservation Strategy

Collectively, the BLM Great Basin subregional ARMPAs provide a landscape-level, science-based, comprehensive, coordinated, collaborative strategy for addressing previously identified threats to the GRSG and a means to remedy the need for "regulatory certainty" leading to the 2010 "warranted but precluded" finding by the FWS. ,

These plans reflect over a decade of research, analysis and recommendations for GRSG conservation produced by the WAFWA, the NTT, and the COT. Each of these reports was developed by a collaborative effort of state and federal biologists and scientists with extensive experience in GRSG management and research.

Comment [KK76]: I think the research was done by independent scientists/researchers, not the NTT, COT, WAFWA.

The COT report provided the primary blueprint for development of the GRSG conservation strategy embodied in the 15 sub-regional ARMPAs/ARMPs that will amend or revise 78 BLM and 20 Forest Service plans. Since the COT was chartered to provide guidance for the development of state and federal land management plans by the FWS with the backing of the Sage Grouse Task Force, this is appropriate.

Comment [JRL77]: ARE THESE NUMBERS CORRECT AND HOW MANY PLANS ARE WE NOW TALKING ABOUT?

In addition to these seminal documents, the Fire and Invasives Assessment Team (FIAT) report[7], the USGS compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on GRSG populations -- *Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review*, and the *Integrated Rangeland Fire Management Strategy: Final report to the Secretary* (Manier et al, 2014; DOI 2015b) provided important guidance in the development of critical aspects of the proposed ARMPAs/ARMPs and the overall GRSG landscape-level conservation strategy.

Comment [KK78]: Repeat of text in previous sections

In combination with the sage-grouse conservation actions taken by the individual states within the remaining range of the bird and separate but connected initiatives to address the threat of rangeland fire, ~~to curb the continuing spread of non-native invasive grasses,~~ and to promote conservation measures to benefit the Greater sage-grouse on private lands, the BLM ~~and Forest Service~~ proposed ARMPAs/ARMPs are an essential component of the effort to conserve GRSG and its habitat and obviate the need for a listing of the species under ESA. Combined, the 15 sub-

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[7] Greater Sage-Grouse Wildfire. Invasive Annual Grasses, and Conifer Expansion Assessment. June 2013.

regional proposed ARMPAs/ARMPs would affect nearly half of the remaining habitat for the species.

Comment [JRL79]: Numbers? CHECK!

The BLM ARMPAs/ARMPs are the product of extensive coordination, including the active engagement of the FWS in helping to inform land allocation and related management decisions by the land management agencies. They also benefit from strong collaboration with the states and reflect the unique landscapes, approaches, and priorities in each. While this has added to the challenge of developing a complete, comprehensive, and coordinated conservation strategy, it has also strengthened the proposed ARMPAs/ARMPs and is likely to increase the commitment of all partners to implementation ~~upon completion~~of these plans.

Comment [KK80]: This seems to be a repeat of the last paragraph in this section – can we delete this and just keep the last paragraph?

Comment [KK81]: Since these are BLM plans, BLM can proceed with implementing; the benefit is that the partners can also implement on private & state lands . . . ???

In the introduction to the COT report, the state and federal partners who authored the report reiterated their charge,

> "… the development of range-wide conservation objectives for the sage-grouse to define the degree to which threats need to be reduced or ameliorated to conserve sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future."

And, in his transmittal letter accompanying the final report, FWS Director Dan Ashe reaffirmed this charge, "I asked the team to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. … Conservation success will be achieved by removing or reducing threats to the species now, such that population trends will eventually be stable or increasing, even if numbers are not restored to historic levels."[8]

The BLM ARMPAs/ARMPs were directly address the specific threats to the viability of the species identified in the COT report (many of which were also identified by the BLM NTT).

Comment [KK82]: Repeat of previous?

Land Allocations for Habitat Protection

Comment [KK83]: This section seems to be a repeat of 1.5.1

The COT emphasized the need to avoid or minimize additional disturbance in PACs (which largely coincide with PHMAs in the proposed LUPs). "Stop the bleeding" was the emphatic plea of the COT with regard to the need to protect the highly valued PACs. As previously noted, the COT stated, "Maintenance of the integrity of PACs … is the essential foundation for sage-grouse conservation." Specifically, the COT recommended "targeted habitat management and restoration" to be achieved by "eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal". The COT recommended an "avoidance first strategy" and stressed that "threats in PACs must be minimized to the extent that population trends meet the objectives of the 2006 WAFWA Conservation Strategy."

In response, the BLM ARMPAs/ARMPs include goals and objectives and land use allocations and management actions for BLM-administered surface and subsurface lands and

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[8] COT report. Transmittal letter by Dan Ashe. February 2013.

resources in PHMAs to retain areas of existing habitats and to avoid new disturbance. Furthermore, the proposed plans avoid, minimize, and offset any unavoidable impacts associated with disturbance from projects that might be developed in PHMA in the future, subject to valid existing rights.

Comment [KK84]: This paragraph could go in the introductory part of 1.5

Land allocations to avoid and minimize additional disturbance in important habitat areas (identified as PHMAs in most ARMPAs/ARMPs) included some closures (primarily in portions of the Lander LUP) but rely primarily on the use of no surface occupancy (NSO) associated with any future development of oil, gas, and geothermal reserves in PHMAs for most proposed LUPs (with the exception of core areas in the Wyoming proposed LUPs and geothermal leasing in Nevada). Renewable energy development (solar and wind) is excluded in the PHMAs, in most proposed LUPs, with avoidance used in some proposed LUPs, particularly in Wyoming and Oregon.

Similarly, mineral development, with the exception of locatable minerals governed under the 1872 Mining Act, is closed in the large majority of PHMAs for non-energy leasable minerals and saleable minerals. An exception was granted for free use permits and the expansion of existing active pits for mineral material sales. The BLM will determine at the time of a new coal lease or lease modification whether the lease application area is "unsuitable" for all or certain coal mining methods recognizing that PHMAs are “essential habitat” for purposes of suitability determinations.

New rights of way for transmission lines, pipelines, and related infrastructure development in PHMAs will be avoided through restrictions on land use authorizations in the proposed LUPs. Exceptions would be limited and based on rationale that explicitly demonstrates that adverse impacts will be avoided or that residual impacts could be mitigated. Also, new recreation facilities would not be authorized in PHMAs unless there is a net conservation gain for GRSG.

In general, all forms of new development – from energy, to transmission lines, to recreation facilities and grazing structures would be excluded, avoided, or developed only if the resultant effect is neutral or beneficial to the GRSG in PHMA. In all instances, whether in PHMA or GHMA (except in Wyoming only in PHMA), any adverse impacts associated with development would have to be compensated for with habitat protection or restoration activities that produced a net conservation benefit for the GRSG.

While the COT report identified PACs as “crucial building blocks of a successful conservation strategy”, the COT also emphasized that “sage-grouse habitats outside of PACs may also be essential… [and therefore] conservation of habitats outside of PACs should include minimization of impacts to sage-grouse and healthy native plant communities.” Consistent with this guidance, restrictions on development in GHMA are less stringent and can accommodate a limited amount of disturbance. Disturbance associated with oil and gas development, for example, is subject to seasonal and timing restrictions rather than NSO with limited exceptions and GHMA is generally an avoidance area for renewable energy rather than an exclusion area. However, any disturbance is subject to mitigation and should seek to first avoid, then minimize any adverse effects to habitat while offsetting unavoidable impacts to a standard that produces a net conservation gain for the species (except in Wyoming).

The proposed ARMPAs/ARMPs provide an added element of habitat protection for GRSG strongholds identified by the FWS in a memo to Director Kornze and Chief Tidwell in October, 2014[9]. The proposed LUPs designate a subset of PHMA as Sagebrush Focal Areas (SFAs) to be administered by the BLM and the Forest Service. SFAs consist of areas of largely intact priority habitat, primarily under federal management, with greater GRSG bird densities and high resistance and resilience to fire. As the FWS communicated to BLM and Forest Service leadership that "[s]trong, durable, and meaningful protection of federally administered lands in these areas will provide additional certainty and help obtain confidence for long term sage grouse persistence," land allocations for these areas were intended to avoid future surface disturbance to the maximum extent. Land allocations in the SFAs require NSO with no exceptions for oil, gas, and geothermal development. The proposed plans will also include a recommendation that these areas be withdrawn by the Secretary from mineral entry under the 1872 Mining Act (in the RODs of proposed Forest Service plans). SFAs will also be prioritized for restoration and conservation action. While the SFAs have minimal land surface disturbance and, based on existing, available data, limited mineral potential, valid existing rights – as in all habitat – will be recognized and be able to proceed in accordance with their legal rights.

Management Direction, Prioritization, and Mitigation

Comment [KK85]: Seems to be a repeat of 1.5.2 & 1.5.3, with a little 1.5.1

In addition to land allocations to protect SFAs, PHMAs, and GHMAs, the ARMPAs/ARMPs guide other uses of these landscapes to meet COT objectives consistent with existing, authorized uses of GRSG habitats and the sagebrush landscape.

Grazing is the most widespread use of the sagebrush steppe ecosystem. In order to ensure that grazing continues in a manner consistent with the objective of conserving the GRSG, the proposed LUPs will require the incorporation of GRSG habitat requirements into the vegetative management objectives for proposed actions, including authorizations for grazing allotments, consistent with the ecological potential of the landscape. The COT recommends, "Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for GRSG (e.g. shrub cover, nesting cover)."

The proposed LUPs place a priority on the review and update of grazing allotment management to incorporate standards, guidelines, and habitat objectives, and to ensure that they are being met consistent with ecological site potential. Priority will be given, first, to the review of allotments in SFAs, then PHMAs, followed by GHMA; focusing first on riparian and wet meadows, and, if the standards, guidelines, or habitat objectives are not being met due to improper grazing, to work with the permittee to make progress towards meeting them. Anticipated increases in BLM funding for implementation of the proposed LUPs will support additional conservation and restoration actions, as well as monitoring, to continue to ensure healthy public land grazing consistent with the conservation of GRSG habitat.

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[9] Memorandum from Dan Ashe to Director, BLM and Chief, USFS, "Greater Sage Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important landscapes. October 27, 2014.

With regard to future leasing and development for oil and gas, the proposed LUPs recognize the value of encouraging future development in areas of low conflict with GRSG habitat. Analysis of existing and available data by the BLM indicates that a majority of the acres of land with high and medium potential for oil and gas development in the western U.S. are outside of identified GRSG habitat. To benefit GRSG conservation efforts and to assist developers in reducing the time and cost associated with oil and gas leasing and development in areas of likely conflict with other multiple-use values, the BLM will prioritize new leasing in areas outside of SFAs, PHMAs, and GHMAs.

Comment [KK86]: Could use some of this text to amplify smart from the start in 1.5.1 above

Fire represents the greatest threat to GRSG survival in the Great Basin region. Recognizing the nature and extent of this threat, the ARMPAs/ARMPs provide specific guidance for improving efforts to reduce the risk of GRSG habitat loss to wildfire, including fire prevention and the restoration of habitats impacted by fire. However, to develop a more complete and comprehensive strategy for dealing with this threat, the Department of the Interior and the BLM convened a conference in November, 2014 of scientists, state and federal officials, leaders in the fire community, and an array of stakeholders to discuss ways to improve the efficiency and effectiveness of rangeland fire management. The conference led to Secretarial Order 3336 and recognition that,

> "Protecting, conserving, and restoring the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat, while maintaining safe and efficient operations, is a critical fire management priority for the Department. Allocation of fire management resources and assets before, during, and after wildland fire incidents will reflect this priority, as will investmentsrelated to restoration activities.[10]

In accordance with that Order, a strategy for fire prevention, suppression, and post-fire restoration was developed and delivered to the Secretary in May 2015. The Order and subsequent report, *An Integrated Rangeland Fire Management Strategy: Final Report to the Secretary of the Interior*, directed substantial changes in policy and management direction affecting all aspects of the rangeland fire management program – from better coordination between resource managers and fire management officers; to the identification and prioritization of prevention, suppression, and restoration efforts in SFAs, PHMAs, and GHMAs; to the commitment of additional equipment and crews for rangeland firefighting; to additional funding and policy direction to improve post-fire restoration; to the completion of an initiative to collect, store, and better utilize native seed and sagebrush in post-fire restoration of sagebrush steppe ecosystems. This effort, and the initiative to fight the spread of non-native invasive species that contributes to higher rangeland fire risk (e.g. cheatgrass) discussed below, hold the potential to fundamentally change how rangeland fire is managed to benefit sagebrush ecosystems and GRSG habitat.

Comment [JRL87]: Add link

Comment [KK88]: Compare this to 1.5.3 & adjust 1.5.3 if needed . . .

The COT report – and other more recent research and analysis – amplify concern for the contribution of cheat grass and other invasive species to the loss of GRSG habitat associated with increased fire frequency and intensity. Work initiated by the WAFWA and based on recent research by Chambers (Chambers et al, 2014b) led to the Fire and Invasives

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[10] Secretarial Order 3336. Rangeland Fire Prevention, Management and Restoration. January 2015.

Assessment Tool[11] and a subsequent assessment that identified areas of resistance and resilience to fire. This information is leading to targeted and aggressive efforts to reduce the risk and impacts of rangeland fire that could impact hundreds of thousands of acres of GRSG habitat, as well as restore areas with high potential to be resilient to the impacts of climate change and subsequent rangeland fires. The BLM is also committed to and accelerating the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasive species. In addition, by using the FIAT assessments and overlaying maps of SFAs, PHMAs, and GHMAs, land managers from all levels of government can more efficiently allocate and use fire resources at initial attack, to stop fire early and prevent catastrophic habitat loss.

Comment [KK89]: Anything in here that should be in 1.5.2 or 1.5.3?

Even prior to completion of the FIAT assessment, BLM shifted funding for fuels management to protect landscapes of importance to the GRSG. Under the FY2014 Omnibus Appropriation, BLM prioritized the funding of treatments and activities within each state that benefit GRSG.

In 2014, treatment and activities which identified GRSG as a species of interest accounted for $28,328,658 in funding and treatments of 241,343 acres. Prior to FY2014, numerous other examples of positive impacts from the Fuels Management Program exist. The table below summarizes (by state) accomplishments and funding spent on fuels reduction projects that benefited GRSG from FY2003 to FY2013 (Table Z) .[12]

Comment [KK90]: Should this be included? Not ROD . . .

Table Z. FY2003 to FY2013 Fuels Funds Spent on GRSG by State

State	Acres	Funding
CA	28,719	$5,762,190
CO	18,534	$1,942,940
ID	529,972	$32,326,379
MT	15,496	$3,688,980
NV	161,353	$11,126,931
OR	196,180	$12,131,581
UT	277,014	$21,507,312
WY	78,956	$3,601,211
Grand Total	**1,306,224**	**$92,087,524**

Some areas that were not included as PACs may still have great potential for providing important habitat if active habitat management is implemented. For example, removal of early-stage juniper stands may render currently unsuitable habitat into effective habitat for GRSG (this is also true for degraded habitats within PACs). The COT report encourages state and federal agencies to actively pursue these opportunities.[13] As noted in this report, since 2010, the NRCS through its Sage Grouse Initiative (SGI) in collaboration with states and private landowners and BLM on public lands have worked to eliminate pinyon-juniper trees on over 400,000 acres of

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[11] WAFWA FIAT report

[12] BLM Fuels Management Benefits Toward Sage Grouse Habitat. March 2014.

[13] COT Report. page 33.

private and over 400,000 acres of public lands, respectively, across western landscapes. In addition, using the FIAT the BLM has identified and prioritized areas for treatment of annual invasive grasses and conifer expansion on federal lands as a basis for improved targeting of federal resources[14] (See Figure Z. FY 2015 FIAT Priority Project Planning Areas). As illustrated, the areas designated as Priority 1and 2 project planning areas essentially coincide with the stronghold areas identified by the FWS and incorporated in the Great Basin ARMPAs as designated SFAs.

Comment [KK91]: Should this be included in the ROD?

Comment [JRL92]: Should we include this here?

Comment [KK93]: Is this true? – if it is true, it was not intentional, since FIAT was done without SFAs – I'd like to see the analysis that support this.

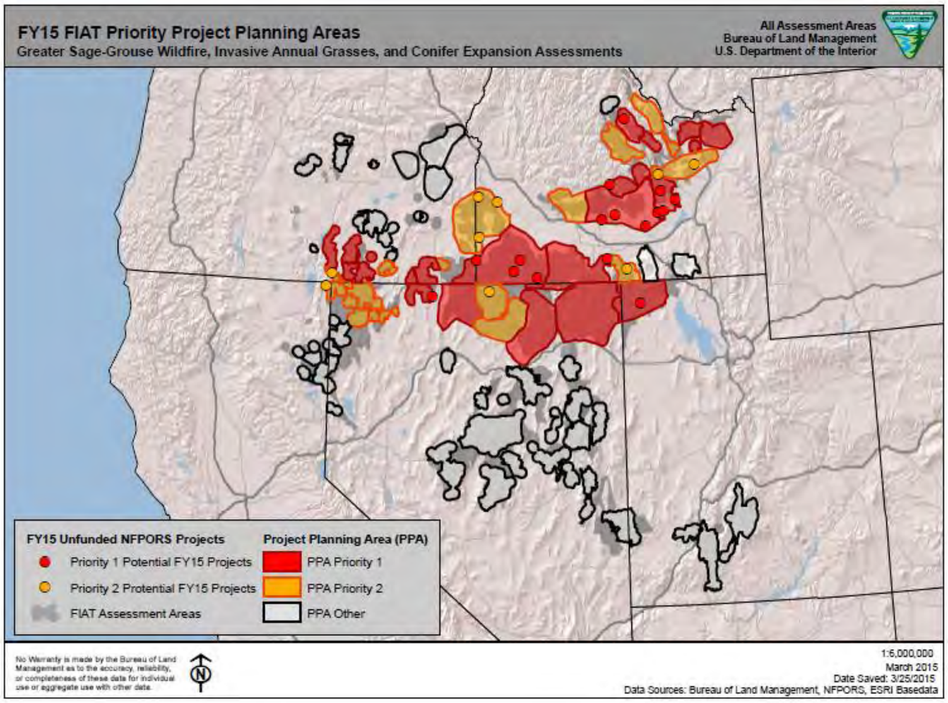

Figure Z. FY 2015 FIAT Priority Project Planning Areas with Focus on Invasive Annual Grasses and Conifer Expansion Assessments.

In addition, the Department has recently committed $7.5 million to projects in GRSG habitat to create more resilient landscapes and BLM has allocated $12 million to increase firefighting resources aimed at stopping fires while they are small in the Great Basin. The Department has identified required policy changes to increase the commitment, flexibility and timeframe for use of Emergency Stabilization and Burned Area Restoration (ES & BAR) funding on priority sagebrush-steppe habitats. Combined with commitments in the final rangeland fire report to Secretary Jewell to accelerate the registration and use of chemical and biological agents to stem the spread of cheatgrass and other invasives, these additional actions will lead to a more

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[14] WAFWA. Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment. June 2014.

robust and effective rangeland fire management effort in 2015 and beyond. In 2016 and beyond, BLM is anticipating a funding increase to implement the GRSG proposed LUPs; these increases are included in both the House and Senate FY 2016 appropriations marks and will lead to more robust and effective management of GRSG habitat and the threats to it, including fire. BLM intends to continue to prioritize and request funding for GRSG management in 2017 and beyond.

Comment [KK94]: Is this Appropriate for a ROD?

The proposed LUPs also target additional conservation efforts to address other threats to the GRSG. Proposed LUP direction to incorporate GRSG habitat objectives into the establishment of allowable management levels (AMLs) for wild horses and burros (free-roaming equids) and to prioritize gathers and removal to reach AMLs in SFAs, PHMAs, and GHMAs (in that order) will better target these efforts to benefit the GRSG.. Anticipated funding increases for GRSG proposed LUP implementation in FY 2016 will allow the BLM to make substantial progress toward that goal, beginning with efforts to achieve AMLs in SFAs. At the same time, the BLM has made a considerable investment in concert with the National Academy of Sciences in new research of methods to reduce wild horse and burro reproduction rates. Through a combination of targeted gathers and the development of an effective agent for reducing future free-roaming equid reproductive rates, the BLM is optimistic that, over time, this threat to GRSG can be effectively mitigated.

Comment [KK95]: Supplement 1.5.1?

Although future high voltage transmission lines will be avoided in PHMA, the planning, siting, and environmental review of a limited number of Presidential priority lines (Gateway West, Boardman to Hemingway, and Transwest Express, including those portions of Gateway South that are co-located) has been underway for a number of years. These lines are critical to expanding access to renewable sources of energy (especially wind) and to improving the reliability of the western grid. For these reasons, planning for these lines will proceed and potential impacts to GRSG will be fully mitigated (1) through micrositing to adjust the route to avoid important habitat and leks, (2) through transmission tower design to minimize the potential for adverse impacts to GRSG such as perching for predators, and (3) through compensatory mitigation measures, such as habitat restoration and pre-suppression activities to reduce the risk of habitat loss due to fire, to offset any unavoidable impacts to a conservation gain standard.

Comment [KK96]: Is this detail needed in a ROD? Is this already somewhere else?

Mitigation for activities adversely impacting GRSG or GRSG habitat in PHMA or GHMA (PHMA only in Wyoming) will be designed to a net conservation gain standard consistent with the recommendation included in the September 2013 FWS report, *Greater Sage-Grouse Range-Wide Mitigation Framework*. According to the authors, the report was prepared

> "to communicate some of the factors the Service is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to GRSG. The recommendations provided here are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report for sage-grouse"[15].

At the same time, BLM and Forest Service will partner with the states over the next 6 months

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[15] USFWS. Greater Sage-Grouse Range-Wide Mitigation Framework. Version 1.0. September 3, 2014.

to develop regional mitigation strategies coinciding with WAFWA GRSG management zones, to guide mitigation efforts in each zone and monitor mitigation effectiveness. The collaborative effort to develop a mitigation strategy will ensure that mitigation is consistent with the principles and goals set out in Secretarial Order 3330, *Improving Mitigation Policies and Practices of the Department of the Interior* and accompanying report[16] and the new Departmental Manual guidance on landscape-level mitigation.

Comment [KK97]: Repeat of mitigation section

Additional conservation measures

In addition to land allocations and management actions included in the proposed LUPs to conserve the GRSG, measures were included to ensure that disturbance to leks could be reduced or minimized through the application of disturbance caps and required minimum buffer distances for a number of categories of disturbance, consistent with best available science.

Disturbance caps of 3% or 5% (for Wyoming and, likely in the future, Montana) were established in accordance with recommendations contained in the COT report. Disturbance will be calculated based on established Biologically-Significant Units (BSUs) developed by an interagency team and includes focus on protecting leks.

The proposed ARMPAs also include an additional layer of protection for leks to be applied at project implementation. During NEPA development for a project, the appropriate buffer, based on the USGS report *Conservation Buffer Distance Estimates for GRSG – A Review* (Manier et al, 2014), will be used to site and mitigate projects, subject to applicable laws and regulations and valid existing rights. Because of the great variation in landscapes, local science, and local regulations, justifiable departures, both up and down, from these lek-buffer distances may be appropriate to fully address impacts to leks. In fact, the COT recommends that such conservation measures be based on best available science with consideration of local ecological conditions.

For BLM approved actions (not including Wyoming), the BLM and Forest Service will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis by preferentially locating the action outside of the buffer distance and, if that is not possible, approving the project only if certain criteria are met with the goal of ensuring no impacts to leks in PHMAs and no more than minor impacts in GHMAs.

This approach to minimizing impacts to leks reflects guidance from the COT report:

> "Conservation of sage-grouse habitats outside of the PACs should be closely coordinated with each state. For those states with sage-grouse management plans, or similar documents adequately addressing the conservation of sage-grouse that have been developed in coordination with FWS, decisions on management of those areas should defer to those plans. Conservation of habitats outside of PACs should include

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[16] Clement, J.P. et al. 2014. A strategy for improving the mitigation policies and practices of the Department of the Interior. A report to the Secretary of the Interior from the Energy and Climate Change Task Force, Washington, D.C., 25 p.

> minimization of impacts to sage-grouse and healthy native plant communities. If minimization is not possible due to valid existing rights, mitigation for impacted habitats should occur".[17]

Comment [KK98]: Repeat of 1.5.1 (except this section still has all the RM stuff in it)

Consistent with recommendations contained in the 2006 WAFWA *Greater Sage-Grouse Range-wide Conservation Strategy*, the BLM and Forest Service conservation strategy places heavy reliance on monitoring and evaluation to assess the success of management decisions incorporated in the proposed LUPs and, ultimately, in the effectiveness of implementing these proposed LUPs. Monitoring plans will be interagency in nature and incorporate evaluation of GRSG population trends by the states and changes in habitat condition by the federal land management agencies. As the WAFWA report states,

> "Monitoring provides the "currency" necessary to evaluate management decisions and to assess progress or problems. Adequate monitoring should be considered an integral and inseparable component of all management actions, and there, not optional. Lack of proper monitoring will undoubtedly hinder this large-scale conservation effort."[18]

In addition, the conservation strategy incorporates an adaptive management framework that provides an "early warning system" of "soft triggers" to alert resource managers to the need to evaluate the effectiveness of their management strategies should changes in population levels or habitat conditions occur. If management responses to soft triggers do not adequately address the causes for population or habitat declines and "hard triggers" are reached, more significant changes in management actions and land allocations will occur to ensure that more protective measures to conserve the species are in place.

Comment [KK99]: Duplicate of monitoring & adaptive management section

Guided by the COT report and NTT and WAFWA recommendations, the BLM ~~and Forest Service~~ conservation strategy directly addresses the threats identified in the COT report consistent with many of the specific recommendations provide by the COT, the NTT, and WAFWA. These changes in management direction from existing BLM RMPs ~~(with the exception of the Lander LUP which was completed in 2014) and Forest Service LUPs~~ are designed to avoid and minimize any additional surface disturbance in PHMAs and provide a high level of protection for FWS-identified stronghold areas. Recognizing the potential importance of areas in GHMA, the proposed LUPs include measures that protect and restore habitats in these areas while providing greater flexibility for development activities.

Comment [JRL100]:

The unprecedented collaboration with states in the development of these proposed LUPs, in conjunction with the close coordination between the BLM and Forest Service with input from the FWS, provides a strong foundation for conservation efforts to protect and restore habitats essential to the conservation of the GRSG. Informed by best available science, and in concert with additional actions, such as those to more efficiently and effectively address the threat of rangeland fire consistent with direction in S.O. 3336 and the investments made to improve sage-grouse habitat through voluntary actions on private lands through the NRCS' Sage Grouse Initiative (SGI), this strategy reflects a high level of commitment by state and federal partners to conserve the GRSG and its habitat. The landscape-level strategy consisting of reinforcing

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[17] COT Report, page 36.

[18] WAFWA report, page xxiii.

conservation actions that will go into effect upon completion of the BLM ~~and Forest Service~~ ARMPAs as well as those actions being implemented currently to conserve the species, reflect a significant change in management direction and philosophy for both resource management agencies since 2010 and a long-term commitment to assure the conservation of the species consistent with the objectives set in the 2006 WAFWA conservation strategy and embraced by both the NTT and the COT.

Comment [KK101]: Seems like a good summary – but most of the rest seems to repeat what is already in the previous sections.

2. DECISION

2.1 Summary of the Approved Management Decisions

The decision is hereby made to approve the Great Basin Region Greater Sage-Grouse ARMPAs for the Great Basin Region Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah (attachments A, B, C, and D). This ROD serves as the final decision establishing the land use plan amendment decisions outlined in the ARMPAs and is effective on the date it is signed. No further administrative remedies are available for these land use plan decisions.

The decisions included in this ROD and attached ARMPAs amend the land use plans described in **Sections 1.1** of attachments A, B, C, and D. This ROD and ARMPAs become effective on the date this ROD is signed. The BLM prepared the ARMPAs under the authority of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [U.S.C.] 1701 et seq.) and other applicable laws. The BLM prepared EISs in compliance with the National Environmental Policy Act (42 U.S.C. 4321-4347) as amended (NEPA), and BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1601 et seq.).

The land use decisions provide conservation measures to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat. Land use plan decisions are expressed as goals and objectives (desired outcomes), and allocations, allowable uses, and management decisions anticipated to achieve desired outcomes. Although decisions identified in the ARMPAs are final and effective upon signing of this ROD, they generally require additional implementation decision steps before on-the-ground activities can begin. Subsequent NEPA analysis will be conducted, as necessary, for such implementation decisions.

2.2 What the Record of Decision and Approved Resource Management Plan Amendments Provide

The ARMPAs include GRSG and GRSG habitat land use plan level management decisions in the form of:

- Goals
- Objectives (Desired Future Conditions)
- Land Use Allocations and Allowable Uses

- Management Actions

Goals are the broad statements of desired outcomes, and are usually not quantifiable.

Objectives are specific desired conditions, usually quantifiable and measurable, and may have timeframes for achievement.

Land use allocations specify locations within the planning area that are available or not for certain uses and are also used prioritize conservation and restoration management actions. These include decisions such as what lands are available for livestock grazing, mineral material use, oil and gas leasing, and locatable mineral development, what lands may be available for disposal via exchange and/ or sale, and what lands are open, closed, or limited to motorized travel (please note that all acreages presented in the Approved Plan are estimations even when presented to the nearest acre).

Management actions include those provisions that help in meeting the established goals and objectives and include measures that will be applied to guide day-to-day activities on public lands..

The ARMPAs' management decisions were crafted to alleviate identified threats to GRSG and their habitats (see **Section 1.5**).

2.3 What the Record of Decision and Approved Resource Management Plan Amendments Do Not Provide

The attached ARMPAs do not contain decisions for public lands outside of GRSG habitat management areas, except for travel management decisions in the Idaho and Southwestern Montana ARMPA.

The ARMPAs do not affect valid existing rights.

The ARMPAs do not contain decisions for the mineral estates of lands located in the planning area for lands under the jurisdiction of other Federal agencies such as the Forest Service, or for private or State-owned lands and minerals that are not administered by the BLM. In addition, many decisions are not appropriate at this level of planning and are not included in the ROD. Examples of these types of decisions include:

- *Statutory requirements.* The decision will not change the BLM's responsibility to comply with applicable laws, rules, and regulations.
- *National policy.* The decision will not change BLM's obligation to conform to current or future National policy.
- *Funding levels and budget allocations.* These are determined annually at the National level and are beyond the control of the State/District of Field offices.

Implementation decisions (or activity-level decisions) are management actions tied to a specific location. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed and require appropriate site-specific planning and NEPA analysis. Such decisions may be incorporated into implementation plans (activity or project plans) or may exist as stand-alone decisions. These ARMPAs do not contain implementation decisions. Future activity-level plans will address the implementation of the ARMPAs. Implementation decisions and management actions that require additional site-specific project planning, as funding becomes available, will require further environmental analysis.

2.4 Modifications and Clarifications

During preparation of the ARMPAs for all four sub-regions, minor changes were made to the Proposed RMP Amendments to correct errors and to clarify decisions. Clarifications and corrections made since the Proposed RMP Amendments were published on May 29, 2015 are hereby adopted by this ROD.

2.4.1 Modifications and Clarifications by Sub-region

Modifications and clarifications are summarized below for each of the sub-regional ARMPAs.

Idaho and Southwestern Montana

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Nevada and Northeastern California

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Oregon

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

Utah

All references to National Forest System lands in both text and on maps have been removed from the BLM ARMPA. This is because the U.S. Forest Service has completed a separate ROD and Land and Resource Management Plans under their planning authorities.

Need to populate once we have a clear idea as to what changes will need to be made. Will need to work with the planners.

2.4.2 Protest Resolution

BLM's planning regulations at 43 CFR 1610.5-2 allow any person who participated in the planning process and has an interest that may be adversely affected by BLM's planning decisions to protest proposed planning decisions within 30 days from the date the Notice of Availability of the Proposed

RMPA/Final EIS was published in the Federal Register (May 29, 2015). Below are descriptions of the protest resolution process for each of the four sub-regional PRMPAs/FEISs.

These decisions are final for the Department of the Interior. With the exception of the granted protest issues, the Director concluded that the BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Proposed Land Use Plan Amendments/Final EISs. Each protesting party will be notified in writing of the Director's findings and the disposition of their protests. The BLM Director resolved the protests without making significant changes to the Proposed Land Use Plan Amendments/Final EISs, though minor clarifications were made and are summarized in Section 2.5.1.

Idaho and Southwestern Montana

For the Idaho and Southwestern Montana GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Idaho and Southwestern Montana GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Nevada and Northeastern California

For the Nevada and Northeaster California GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Nevada and Northeastern California Sub-Regional GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Oregon

For the Oregon GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Oregon GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

Utah

For the Utah GRSG Proposed Land Use Plan Amendment/Final EIS, the BLM Director received X letters of protest within the protest period. Of these, X protesting parties had standing and included valid protest issues. Valid protest issues submitted included: X. Of those issues, the BLM granted in part X protest regarding X. The BLM Director's decisions on the protests are summarized in the "Director's Protest Resolution Report, Utah GRSG Proposed RMP Amendment/Final EIS," released on X and available on the following BLM website: http://www.blm.gov/wo/st/en/prog/planning/planning_overview/protest_resolution/protestreports.html.

Will need to populate the "X" areas towards the end of the protest resolution process (end of July).

2.4.3 Governors Consistency Review

The BLM's planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs also are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands" (43 CFR 1610.3-2(a)). The general requirement in FLPMA/planning regulations is to coordinate the land use planning process with plans of other agencies, states, and local governments to the extent consistent with law (see FLPMA s. 202(c)(9) and 1610.3-1(a)); and the respective duties to be consistent with both officially approved or adopted plans (to the extent those plans are consistent with federal law, or to maximum extent practical) (see 1610.3-2(a)(b)). In accordance with FLPMA, the BLM was aware of and gave consideration to state, local, and tribal land use plans and provided meaningful public involvement of the Proposed RMP Amendments/Final EISs.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

In some instances, modifications to the Proposed RMP Amendments were addressed based on recommendations submitted to the BLM by the applicable states. These modifications to the ARMPAs are summarized below by sub-region and are now part of the attached ARMPAs.

Idaho and Southwestern Montana

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Nevada and Northeastern California

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Oregon

Will need to populate the "X" areas towards the end of the GCR process (end of July).

Utah

Will need to populate the "X" areas towards the end of the GCR process (end of July).

3. ALTERNATIVES

3.1 Alternatives Considered

Each of the Great Basin sub-regional planning efforts analyzed in detail a set of alternatives in the draft and final sub-regional EISs. The alternatives were developed to provide direction for resource programs influencing land management for the protection and enhancement of GRSG and its habitat. All management under any of the alternatives complied with federal laws, rules, regulations, and policies.

Each alternative emphasized an altered combination of resource uses, allocations, and restoration measures to address issues and resolve conflicts among uses so that GRSG goals and objectives were met in varying degrees across the alternatives. The action alternatives offered a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the land use plan goal was the same across alternatives for each sub-region, each alternative contained a discrete set of objectives and management actions constituting a separate RMP amendment. The goal was met in varying degrees, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differed as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law there are typically few or no distinctions between alternatives.

3.1.1 Alternative A – No Action Alternative

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction derived from the existing field/district office RMPs, as amended. Goals and objectives for resources and resource uses are based on the most recent RMP decisions, along with associated amendments and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

This alternative was not selected as the ARMPAs because it did not meet the purpose and need of this plan amendment. This alternative did not include changes that are needed to be made to the existing decisions based on the USFWS 2010 listing petition decision that identified inadequacy of regulatory mechanisms as a significant threat to GRSG and its habitat. This alternative did not incorporate the best available science pertaining to GRSG or its habitat.

3.1.2 Alternative B: National Technical Team Report Alternative

Alternative B was based on the conservation measures contained within the National Technical Team (NTT) Report. The GRSG National Technical Team (NTT), comprised of BLM, Forest Service, FWS, USGS, NRCS, and State specialists, completed *A Report on National Greater Sage-Grouse Conservation Measures* in December, 2011. The charge of the NTT was to identify science-based management considerations for the GRSG (i.e., conservation measures) necessary to promote sustainable sage-grouse populations, and which focused on the threats (75 FR 13910) in each of the regional WAFWA Sage-Grouse Management Zones. The NTT Report proposed conservation measures based on habitat requirements and other life history aspects of sage-grouse and described the scientific basis for the conservation measures proposed within each program area. The Report also provided a discussion and emphasized the importance of standardizing monitoring efforts across the WAFWA Sage-Grouse Management Zones. The Report can be accessed at: http://www.blm.gov/style/medialib/blm/co/programs/wildlife.Par.73607.File.dat/GrSG%20Tech%20Team%20Report.pdf

The BLM's Washington Office Instructional Memorandum (IM) Number 2012-044 directed the sub-regional planning efforts to analyze the conservation measures developed by the NTT, as appropriate, through the land use planning process and NEPA.

Alternative B would exclude ROW development in PHMA and avoid development in GHMA, would close PHMA to fluid mineral leasing, mineral material sales, and nonenergy leasable minerals, and would recommend withdrawal from locatable mineral entry in all PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat. Management actions for wildfire would focus on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. Collectively, vegetation and wildfire management would conserve GRSG habitat. Grazing would continue with similar impacts under Alternative B as under Alternative A. The best management practices (BMPs) proposed in the NTT report would be included as required design features as part of Alternative B and are listed in Appendix X, Required Design Features (RDFs), of each of the attached ARMPAs.

This alternative was not selected in its entirety as the ARMPAs because the majority of the conservation measures in the NTT Report, as appropriate and applicable, were applied primarily to PHMA, and few conservation measures in the Report were provided for in GHMA. As a result, most management actions in GHMA reverted back to the No Action Alternative, which was found to not meet the purpose and need for the Amendments.

3.1.3 Alternative C: Citizen Groups' Recommended Alternative One

Alternative C was based on a citizen groups' recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and was applied to all occupied GRSG habitat (PHMA and GHMA. Alternative C limited commodity development in areas of occupied GRSG habitat, and closed or excluded large portions of the planning area to many land uses. This included all PHMA and GHMA as being closed to livestock grazing, recommended for withdrawal from locatable mineral entry, closed to fluid mineral leasing, closed to salable mineral and non-energy leasable mineral development, and exclusion areas for right-of-ways. The Utah LUPA/Draft EIS combined this alternative with Alternative F (discussed below).

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. For example, this alternative closed all allotments to livestock grazing, which, based on best available science, is not required to conserve GRSG and its habitats. Alternative C was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.4 Alternative D: Draft RMP Amendments' Preferred Alternative

Alternative D, which was identified as the Preferred Alternative in the Draft EISs, balanced opportunities to use and develop the planning area as well as conserving, maintaining, and enhancing GRSG and their habitat. Protective measures were applied to GRSG habitat, while still allowing for anthropogenic disturbances with stringent mitigation measures. This alternative represents the mix and variety of management actions based on BLM's analysis and judgment, which best resolve the resource issues and management concerns while meeting laws, regulations, and policies pertaining to BLM management. As a result of public scoping comments, internal review, and cooperating agency coordination on the Draft RMP Amendments/EISs, this alternative was modified to become the Proposed RMP Amendments and analyzed in the FEISs. The Preferred Alternatives, with slight variations, became the Proposed Plans in the FEISs.

In PHMA under Alternative D, there would be limitation on disturbance in GRSG habitat by excluding wind and solar energy development (except for certain counties in Southeastern Oregon where avoidance is applied), avoiding all other ROW development, applying no surface occupancy stipulations to fluid mineral development, and closing PHMA to nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat, while allowing other activities, subject to conditions. In GHMA under Alternative D, allocations are less stringent, but still aim to protect GRSG habitat (for example, applying moderate constraints and stipulations to fluid minerals in GHMA).

Under Alternative D, the BLM management would support sagebrush/perennial grass ecosystem restoration, would increase fire suppression in PHMA and GHMA, and would manage livestock grazing to maintain or enhance sagebrush and perennial grass ecosystems.

3.1.5 Alternative E: State/Governor's Alternative

Alternative E is the alternative provided by the State or Governor's offices for inclusion and analysis in the EISs. It incorporates guidance from specific state conservation strategies, if developed or recommendations from the state on management of Federal lands and emphasizes management of GRSG seasonal habitats and maintaining habitat connectivity to support population objectives. This alternative was identified as a co-Preferred Alternative in the Idaho and Southwestern Montana Draft EIS. California did not provide the BLM with a state GRSG conservation plan and under this alternative, reverted back to Alternative A, the no-action alternative.

For Nevada, Alternative E would apply an avoid, minimize, and mitigate strategy to reduce direct and indirect impacts on GRSG from surface-disturbing activities on BLM-administered lands. Effects on GRSG habitat from certain resource programs, such as grazing, lands and realty, wildfire management, and minerals, would not be directly addressed because allocation decisions were not part of the state's plan.

For Oregon, Alternative E contains GRSG conservation guidelines from Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. This document describes the Oregon Department of Fish and Wildlife's proposed management of GRSG on Federal lands. It also provides guidance for public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the state plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of current habitats. The guidelines would also assist resource managers in achieving the population and habitat objectives of the state plan.

For Idaho, Alternative E incorporates proposed GRSG protection measures recommended by the State of Idaho. Management in Montana would remain unchanged from the current RMPs (Alternative A). Alternative E addresses the following primary threats: fire, invasive weeds, and infrastructure development. It also includes guidance for several secondary GRSG threats such as recreation, improper livestock grazing, and West Nile virus for BLM and Forest Service programs that affect GRSG or its habitat.

For Utah, the planning area includes all occupied GRSG habitat in Utah. Alternative E1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah and would apply to all BLM-administered lands in Utah. Alternative E1 was designed to eliminate the threats facing the GRSG while balancing the economic and social needs of the residents of Utah. Conservation measures would be applied to 11 areas that the state identified, called Sage-Grouse Management Areas (SGMAs). Emphasis would be placed on expanding GRSG habitat by aggressively treating areas where there are encroaching conifers or invasive species. Alternative E1 includes a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular SGMAs. Occupied habitat outside of the state-identified SGMAs would not receive new management protection. They would continue to be managed according to the GRSG actions in existing RMPs and conservation measures associated with existing activity-level plans.

This alternative was not selected, in whole, as the ARMPAs because some components of the state's plans were not consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands. However, many goals, objectives, and management actions in the ARMPA were carried forward.

3.1.6 – Alternative F: Citizen Groups' Recommended Alternative Two

Alternative F is also based on a citizen group recommended alternative. This alternative emphasizes improvement and protection of habitat for GRSG and defines different restrictions for PHMA and GHMA. Alternative F would limit commodity development in areas of occupied GRSG habitat, and would close or designate portions of the planning area to some land uses. This alternative does not apply to the Utah sub-regional planning effort, as it was combined with Alternative C. Under Alternative F, wildfire suppression would be prioritized in PHMA. Concurrent vegetation management would emphasize sagebrush restoration and enhancement. Alternative F would reduce livestock and wild horse and burro management utilization by 25 percent within PHMA and GHMA.

This alternative was not selected in its entirety as the ARMPAs because it limited the use of public land in PHMA and GHMA to such as extent that it did not give adequate accommodation to local needs, customs, and culture. Alternative F was also not selected in whole because it does not best achieve the mix of multiple uses necessary to fully implement the mandate of FLPMA.

3.1.7 – Proposed Plan Amendment

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMP Amendments/EISs, the BLM has developed the Proposed Amendments/Final EISs for managing BLM-administered lands. The Proposed Amendments/Final EISs focus on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Amendments/Final EISs are a variation of the preferred alternatives (Alternative D) and are within the range of alternatives analyzed in the DEISs. The Proposed Plans, with slight variations (as outlined in Section 2.5 of this ROD), became ARMPAs.

3.1.8 Environmentally Preferable Alternative Considered in all Sub-Regions

Council on Environmental Quality (CEQ) regulations require that a ROD state which alternatives were considered to be "environmentally preferable" (40 CFR 1505.2(b)). Question 6A of CEQ's 40 most-asked questions regarding CEQ's NEPA regulations defines that term to ordinarily mean the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

Under that definition, Alternative C, as presented in each of the sub-regional Proposed RMP Amendments/Final EISs is the most environmentally preferable. However, NEPA expresses a continuing policy of the federal government to "use all practicable means and measures…to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (Section 101 of NEPA).

3.2 Alternatives Considered But Not Analyzed in Detail

The alternatives listed below by sub-region were considered but were not carried forward for detailed analysis because of one or more of the following reasons:

- They would not meet the requirements of FLPMA or other existing laws and regulations;
- They did not meet the purpose and need;
- The alternative was already captured within the range of alternative analyzed in the EIS;
- They were already part of an existing plan, policy, or administrative function; or
- They did not fall within the limits of the planning criteria.

For additional rationale as to why each of the alternatives listed below by sub-region were not carried forward for detailed analysis, refer to Section 2.11of each of the sub-regional Proposed Amendments/Final EISs.

<u>Idaho and Southwestern Montana</u>

- USFWS-Listing Alternative
- Elimination of Recreational Hunting Alternative
- Predation Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Consideration of Coal Mining Alternative

Nevada and Northeastern California

- Close All or Portions of PHMA or GHMA to OHV Use Alternative
- Elko County Sage-Grouse Plan Alternative
- Increase Grazing Alternative

Oregon

- USFWS-Listing Alternative
- Elimination of Livestock Grazing from all BLM Lands Alternative
- Increase Livestock Grazing Alternative
- Close All or Portions of PHMA or GHMA to OHV Use Alternative

Utah

- USFWS-Listing Alternative
- Increase Livestock Grazing Alternative
- Make GRSG Habitat Available for Oil Shale and Tar Sands Alternative
- Citizen Proposed Alternatives (in their entirety)
- Adoption of the State of Utah's Sage-Grouse Management Areas as PHMA for all Alternatives
- Use of Other Habitat Maps Alternatives
- County Sage-Grouse Management Plans Alternative
- Conservation Objectives Team (COT) Report Alternative
- BLM Policies and Regulations Alternative

4. MANAGEMENT CONSIDERATIONS

The BLM is tasked to provide multiple use management for public lands by the Federal Land Policy and Management Act (FLPMA) and numerous other laws and regulations that govern the management of public lands. Due to the diversity of community needs and stakeholders affected by management of BLM lands, there has been both support and opposition to certain components of the Proposed Plans. BLM's objective in choosing the Proposed Plan Amendments as the ARMPAs was to address diverse needs and concerns in a fair manner and provide a practical and workable framework for management of public lands in GRSG habitat. The BLM is ultimately responsible for preparing these ARMPAs consistent with its legal mandates that reflect collective professional judgment using the best available science. The ARMPAs provide a balance between those reasonable measures necessary to conserve, enhance, and restore GRSG and their habitat by reducing, eliminating, or minimizing threats to GRSG habitat to meet the purpose and need of these plan amendments, and the ongoing public need for use of the public lands within the Great Basin Region planning area.

The ARMPAs were selected because they will reduce or eliminate threats to GRSG at a landscape scale, improve and sustain properly functioning resource conditions, and consider needs and demands for existing or potential resource commodities and values. In the end, GRSG habitat will be managed by integrating ecological, economic, and social principles in a manner that safeguards the long term sustainability, diversity and productivity of the land.

In 2012, the FWS convened a Conservation Objectives Team (COT) of state and federal representatives to produce a recommendation regarding the degree to which threats need to be reduced or ameliorated to conserve the greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The final, peer-reviewed COT Report provided a brief overview of the threats to the greater sage-grouse's survival based upon the FWS 2010 listing decision and an assessment of the extent to which these threats affected remaining GRSG populations. A summary of the nature and extent of threats identified by the COT for each remaining identified population of GRSG in the Great Basin Region– as articulated in the COT report – is summarized in **Table 1-2**. **Table 1-3** provides a crosswalk between the threats to GRSG and their habitat identified in the COT Report and the key management responses from the ARMPAs that aim to ameliorate these threats.

Comment [JRL102]: Addressed above.

~~5. MITIGATION MEASURES~~

~~In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the GRSG including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the FWS in its 2010 listing decision (75 FR 13910), COT report, and depicted in the ARMPAs' Monitoring Framework (which can be found in Appendix X of each of the attached ARMPAs). Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g. avoid, minimize, and compensate). If impacts from BLM management actions and authorized third-party actions (which are consistent with the goals, objectives, and management actions in the attached ARMPAs) that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects would be used to provide a net conservation gain to the species. Any compensatory mitigation would be durable, timely, and in addition to what would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality as described further in the Mitigation Strategy, which can be found in Appendix X of each of the attached ARMPAs).~~

~~All practical means to avoid or minimize environmental harm, specifically to GRSG and its habitat are encompassed in the attached ARMPAs and associated appendices. Mitigation measures, including the application of required design features have been identified.~~

~~The ARMPAs also identify the development of regional mitigation strategies, in partnership with the states, to guide and target mitigation to achieve the greatest benefit to GRSG and habitat conservation and restoration. Within 90 days of the issuance of the Record of Decisions, the BLM will establish a WAFWA Management Zone GRSG Conservation Team to develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for actions and third party authorizations that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat. The mitigation strategy will be developed within one year of the issuance of the Record of Decisions.~~

~~6. PLAN MONITORING AND ADAPTIVE MANAGEMENT~~

Comment [MEM103]: Moved content from the original Section 1.5.3 to here. The CEQ regs do not state that “monitoring” needs to be a standalone, so I think we are ok here.

~~Plan Monitoring~~

~~Monitoring tied to the ARMPAs has two parts: (1) implementation monitoring (i.e., are decisions being implemented in a timely manner, are actions taken consistent with the plan decisions), and (2) effectiveness monitoring (i.e., are the decisions and implementation actions achieving the desired conservation goals). Through effectiveness monitoring, BLM can assess how decisions and actions impact GRSG habitat. Understanding the effectiveness and validating results of ARMPAs and management decisions is an important part of measuring performance under the Government Performance Results Act. For example, riparian condition is a primary measure for ARMPA effectiveness (see WO IM 2010-101). Monitoring that is applicable for evaluating management effectiveness can also be used to address a number of other critical habitat variables (e.g., location, condition, habitat loss or gain, size of patches, etc.). Ideally, monitoring attributes of GRSG habitat, in coordination with population monitoring by state wildlife agencies and other partners, will allow linking real or potential habitat changes (from both natural events and management actions) to vital rates of GRSG populations. This analysis will enable managers to identify indicators associated with population change across large landscapes and to ameliorate negative effects with appropriate conservation actions.~~

~~The BLM Assessment, Inventory, and Monitoring (AIM) Strategy (Toevs et al. 2011 and IB2012-080) describes a vision for integrated, cross-program assessment, inventory, and monitoring of resources at multiple scales of management. Following the AIM Strategy, the BLM is modernizing its resource monitoring approach to more efficiently and effectively meet local, regional, and national resource information needs. The AIM Strategy provides a process for the BLM to collect quantitative information on the condition, trend, amount, location, and spatial pattern of natural resources on the public lands. Each AIM-Monitoring survey, at any scale of inquiry (from the plot level to west-wide deployments), uses a set of core indicators, standardized field methods, remote sensing, and a statistically-valid study design to provide nationally-consistent and scientifically-defensible information to determine conditions (e.g., rangeland health) and trends on public lands.~~

Comment [KK104]: I think this can all be deleted and the first sentence can just flow into the next paragraph

~~The National-scale deployment of AIM, known as the Landscape Monitoring Framework (LMF), commenced in 2011 in coordination with NRCS, with the collection of 1,000 plots of field-collected monitoring data across the Western U.S. LMF aims to provide non-biased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. A group of GRSG habitat and sagebrush plant community subject matter experts from BLM, USFWS, WAFWA, NRCS, ARS, state wildlife agencies, and academia identified those vegetation indicators collected at LMF sampling points that inform GRSG habitat needs. The common indicators that were identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, inter-canopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of GRSG, additional plot locations in occupied GRSG habitat (Sage-grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS Rangeland Monitoring Survey. The GRSG baseline data will be collected over a five year period and an annual report will be prepared describing the status of the indicators. Beginning in year six, the annual status report will be accompanied with a trend report which will be available on an annual basis thereafter contingent upon continuation of the current monitoring budget. This information, in combination with mapping information, mid-scale habitat suitability indicator measures, and sagebrush availability information will be used to assess the effectiveness of the planning strategy.~~

~~The BLM has made significant commitments in the ARMPAs to monitoring actions to conserve GRSG habitats at multiple scales. The results from the monitoring will inform the agencies of the effectiveness~~

~~of efforts to reduce disturbance and restore seasonal habitats in priority areas, and of the status of the triggers set in the proposed LUPs for adaptive management. The BLM will report annually on the results of the monitoring efforts.~~

~~The BLM's Monitoring Framework can be found in Appendix X of each of the attached ARMPAs.~~

~~Adaptive Management~~

~~The ARMPAs include an overarching adaptive management strategy that includes soft and hard triggers and responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. Triggers are based on the two key metrics that are being monitored – habitat loss and/or population declines. Adaptive Management with specific triggers provide additional certainty that the regulatory mechanisms included in the ARMPAs are robust and able to respond to a variety of conditions and circumstances quickly and effectively to conserve GRSG habitat.~~

~~Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped during the life of the proposed LUPsARMPAs, the BLM's response is to apply more conservative or restrictive conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. In each ARMPA, a soft trigger begins a dialogue between the state, FWS, and the BLM to see if the causal factor can be determined and what implementation-level activities can be used to reverse any trend. These adjustments will be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines).~~

~~Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the attached ARMPAs. In the event that new scientific information becomes available demonstrating that the hard trigger would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM ARMPAs, the BLM will immediately assess what further actions may be needed to protect GRSG and its habitat and ensure that conservation options are not foreclosed. This could include a formal directive such as an IM or a plan amendment, which, to the extent that it is supported scientifically, may be drawn from the range of alternatives analyzed in the development of the ARMPAs. ARMPA specific strategies can be found in Appendix X of each of the attached ARMPAs.~~

7. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

The BLM land use planning is conducted in accordance with NEPA requirements, CEQ regulations, and US Department of the Interior policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process, to develop a range of reasonable alternatives to proposed actions, and to prepare environmental documents that disclose the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been at the heart of the planning process leading to these Great Basin Region ARMPAs. These efforts were achieved through Federal Register notices, public formal and informal meetings, individual contacts, media releases, planning

bulletins, and a series of GRSG planning-related Web sites. This section documents the outreach efforts that have occurred to date.

7.1 Public Involvement

The scoping period for the National GRSG Planning Strategy, including the four sub-regional planning areas in the Great Basin Region, began with the publication of the NOI in the Federal Register on December 9, 2011, and ended on March 23, 2012. Beginning in December and ending in February of 2012, the BLM hosted a series of public open house scoping meetings across Northeastern California, Idaho, Southwestern Montana, Nevada, Oregon and Utah. A final National GRSG Planning Strategy Scoping Report was released in May 2012.

A Notice of Availability (NOA) for the Idaho and Southwestern Montana, Nevada and Northeastern California, and Utah Draft RMP Amendments/EISs were published in the Federal Register on November 1, 2013. The Oregon Draft RMP Amendment/EIS was released to the public on November 26, 2013.

For the Great Basin Region GRSG Proposed RMP Amendments/FEIS, Idaho and Southwestern Montana conducted seven public meetings, Nevada and Northeastern California conducted seven public meetings, Oregon conducted seven public meetings, and Utah conducted eight public meetings between November 2013 and January 2014.

Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were considered and incorporated, as appropriate, into the Proposed Plans. The Great Basin Region received approximately 4,990 substantive comments, contained in 74,240 submissions during the four Draft EISs' comment periods. Comments on the Draft RMP Amendments/EISs received from the public and internal BLM review were carefully considered and incorporated as appropriate into the Proposed Plan Amendments. Public comments resulted in the addition of clarifying text, but did not significantly change Proposed RMP Amendments.

A Notice of Availability (NOA) for the Great Basin Region GRSG Proposed RMP Amendments and Final EISs for the Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah Sub-Regions were released on May 29, 2015. The release of the EPA's NOA initiated a 30 day public protest period and a 60 day governors' consistency review. Refer to **Section 2.5** for a full description of the protest period and governors' consistency review outcomes.

7.2 Cooperating Agencies

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating Agencies and tribes "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM 2005). The benefits of enhanced collaboration among agencies in preparing NEPA analyses are:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

The BLM entered into a formal Memorandum of Understanding (MOU) for the National GRSG Planning Strategy with the USFWS and the U.S. Forest Service. In addition, the Great Basin sub-regions' also invited local, state, other federal, and tribal representatives to participate as Cooperating Agencies for these RMP Amendments/EISs. In total, there were 13 MOUs signed with Federal agencies, 10 MOUs signed with state agencies, 55 MOUs signed with counties, and 5 MOUs signed with tribal entities. The MOUs outline the interests, expertise, and jurisdictional responsibilities of both the BLM and its cooperating agency partners and also outlines their respective roles and responsibilities in the planning and NEPA processes. For a full list of these cooperating agencies divided by sub-region, refer to the Cooperating Agencies List at the beginning of this ROD. Additional information can also be found in Chapter 6 of each of the Proposed Amendments/FEISs.

7.2 FWS Section 7 Consultation

Consultation with FWS is required under Section 7(c) of the ESA before the start of any BLM project that may affect any federally listed or endangered species or its habitat. These planning processes are considered a major project, and the four Great Basin sub-regional Final EISs defined potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives analyzed in the FEISs. The FWS is a cooperating agency in this planning process. FWS staff participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

The BLM formally initiated Section 7 consultation with a letter to the USFWS prior to the release of the Draft RMP Amendments/EISs, and requested concurrence on which species would require consideration during consultation. Over the ensuing months, regular meetings were held to identify the species that would be analyzed in the biological assessment, to address which actions could affect those species, and to determine whether the implementation of the Proposed Plan Amendments "may affect" the species for which this consultation occurred.

Prior to the release of the Proposed Amendments/FEISs, the BLM formally submitted the biological assessments to the USFWS for review. The USFWS evaluated the biological assessments and concurred with the "no affect" determination via memorandum for Oregon, Nevada and Northeastern California, and Idaho and Southwestern Montana, which are appendices to each of these ARMPAs. For Utah, formal consultation was required with the FWS due to a "likely to adversely affect" determination associated with the threatened listed Utah Prairie Dog. The biological opinion from the FWS is attached to the Utah ARMPA (Appendix X of Attachment X).

[Verify that the above paragraph is applicable to UT once BLM UT hears back from their local FWS.]

7.3 Native American Consultation

In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual tribes and the federal government, the BLM initiated Native American consultation efforts related to preparation of the four Great Basin sub-regional RMP Amendments/EISs. Coordination with Native American tribes occurred throughout the planning process. In December 2011, the BLM sent letters to 65 tribal governments providing initial notification of the RMP Amendments/EISs and background information on the project, an invitation to be a cooperating agency, and notification of subsequent consultation efforts

related to the planning process. Tribes have been participating in the RMP Amendments/EISs processes through numerous meetings and through personal BLM contacts.

The Draft RMP Amendments/EISs were provided to the Idaho, Montana, Nevada, California, Oregon, and Utah State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMP Amendments/FEISs were also provided to the SHPOs.

[Verify that the above paragraph is applicable to UT.]

Comment [MEM105]: Need to ask EMPSi if they can formulate.

7. REFERENCES

8. APPROVAL

Land Use Plan Amendment Decisions

It is the decision of the Bureau of Land Management (BLM) to approve the Great Basin Region Approved Resource Management Plan (RMP) Amendments for the Nevada and Northeastern California, Oregon, Utah, and Idaho and Southwestern Montana sub-regions, as described in this Record of Decision. The Proposed Plan Amendments and related Final Environmental Impact Statements (EIS) were published on May 29, 2015, in the Federal Register (80 FR 30711). I have resolved all protests and, in accordance with BLM regulations 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of Interior. The approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze Director Bureau of Land Management	Date

Secretarial Approval

I hereby approve the land use plan amendments decisions. My approval of the land use plan decisions constitutes the final decision of the Department of the Interior and, in accordance with regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Department regulations at 43 CFR Part 4. Any challenge to these land use plan decisions must be brought in Federal district court.

Approved by:

Sally Jewell Secretary Department of the Interior	Date

9. ATTACHMENTS

Comment [JRL106]: SUGGEST, AS NOTED, THAT WE INCORPORATE REFERENCED APPENDICES IN THE ROD HERE SEPARATE FROM THEIR APPEARANCE IN EACH OF THE RELEVANT PLANS. THE ROD SHOULD READ AS A "STAND ALONE" DOCUMENT.

Appendix A. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix B. Nevada and Northeastern California Greater Sage Grouse Approved Resource Management Plan Amendment

Appendix C. Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment

Appendix D. Utah Greater Sage-Grouse Approved Resource Management Plan Amendment

PL_PUB_3719
9.1

Summary

This Record of Decision (ROD) is the culmination of an unprecedented effort in public land management to meet the multiple-use and sustained-yield management objectives for public lands administered by the Bureau of Land Management (BLM) in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA).

In response to a 2010 determination by the U.S. Fish and Wildlife Service (FWS) that the greater sage-grouse listing under the Endangered Species Act (ESA) is “warranted but precluded” by other priorities, the BLM, in coordination with the U.S. Department of Agriculture Forest Service (Forest Service) has developed a targeted, multi-tiered, landscape-level management approach, based on the best available science, that offers the highest level of protection for GRSG in the most important habitat areas to address the specific threats identified in the 2010 U.S. Fish and Wildlife “warranted but precluded” decision and Conservation Objectives Team (COT) report.

This Record of Decision (ROD) and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region Greater Sage-Grouse (GRSG) Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon; and Utah includes land use allocations in the ARMPAs that would limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA). In addition to establishing protective land use allocations, the ARMPAs would implement a suite of management actions, such as the establishment of disturbance limits, GRSG habitat objectives, ~~,~~ mitigation requirements, monitoring protocols, and adaptive management triggers and responses, as well as other conservation- measures throughout the range. The cumulative effect of these conservation measures would work in concert to protect, improve, and restore GRSG habitat -across the remaining range of the species in the Great Basin and provide- greater certainty that BLM land and resource management -activities in GRSG habitat in the Great Basin Region ~~can~~ will lead to conservation of the GRSG and other sage steppe associated species in the region.

Comment [JRL1]: The are not tools, but management actions to be implemented by the plans. DDCT is a tool, but establishing disturbance limits is a management action

Comment [JRL2]: This is the suite of actions facilitated by the plans

Comment [JRL3]: Certainty is better than “consistency” as that has become a “trigger” for negative response

Comment [JRL4]: Tie to ultimate goal and to benefit to other species and the ecosystem overall.

In conjunction with the management actions for GRSG included in the ROD and ARMPAs and ARMPRs for the Rocky Mountain GRSG subregion and the implementation actions identified in the Integrated Rangeland Fire Management Strategy to address the threat of fire and invasive species and the opportunity for improved restoration effectiveness, -this ROD and ARMPAs for the Great Basin subregion provides management direction to protect and restore habitat essential to the conservation of the GRSG across its remaining range. This conservation strategy, developed in collaboration with the 11 states in which the ARMPAs and ARMPRs apply, in addition to other state and federal actions underway and in development, represents an unprecedented, collaborative effort among federal land management agencies and the states to manage an entire ecosystem and associated flora and fauna, in order to "conserve the sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future". [Dan Ashe. Transmittal letter to COT report. 2014]

GBR_PUB_0701
9.2
10/1/2015

Prepared in cooperation with the State of Nevada Sagebrush Ecosystem Program, Bureau of Land Management, Nevada Department of Wildlife, and California Department of Fish and Wildlife

Spatially Explicit Modeling of Greater Sage-Grouse (*Centrocercus urophasianus*) Habitat in Nevada and Northeastern California: A Decision Support Tool for Management

Open-File Report 2014-1163

U.S. Department of the Interior
U.S. Geological Survey

Cover: Photograph of a male greater sage-grouse performing a courtship display on a lek in Nevada.
Photograph courtesy of Tatiana Gettleman.

Spatially Explicit Modeling of Greater Sage-Grouse (*Centrocercus urophasianus*) Habitat in Nevada and Northeastern California—A Decision-Support Tool for Management

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Open-File Report 2014–1163

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2014

Suggested citation:
Coates, P.S., Casazza, M.L., Brussee, B.E., Ricca, M.A., Gustafson, K.B., Overton, C.T., Sanchez-Chopitea, E., Kroger, T., Mauch, K., Niell, L., Howe, K., Gardner, S., Espinosa, S., and Delehanty, D.J. 2014, Spatially explicit modeling of greater sage-grouse (*Centrocercus urophasianus*) habitat in Nevada and northeastern California—A decision-support tool for management: U.S. Geological Survey Open-File Report 2014-1163, 83 p., *http://dx.doi.org/10.3133/ofr20141163*.

ISSN 2331-1258 (online)

Contents

Figures

Tables

Conversion Factors and Datums

Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
	Area	
acre	4,047	square meter (m^2)
acre	0.4047	hectare (ha)
acre	0.4047	square hectometer (hm^2)

SI to Inch/Pound

Multiply	By	To obtain
	Length	
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
meter (m)	1.094	yard (yd)
	Area	
square meter (m^2)	0.0002471	acre
hectare (ha)	2.471	acre
square hectometer (hm^2)	2.471	acre
square meter (m^2)	10.76	square foot (ft^2)

Datums

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD83).

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88)”

Elevation, as used in this report, refers to distance above the vertical datum.

Acronyms and Abbreviations

AICc	Akaike's information criterion with second-order bias correction
ΔAICc	difference between model of interest and most parsimonious model
CDFW	California Department of Fish and Wildlife
GIS	Geographic Information System
GPS	Global Positioning System
HSI	habitat suitability index
K	number of parameters
κ	Cohen's kappa coefficient
LANDFIRE	Landscape Fire and Resource Management Planning Tools
MCP	Minimum Convex Polygon
PMU	population management unit
PTT	Platform Transmitter Terminal
NDOW	Nevada Department of Wildlife
r	correlation coefficient
RSF	resource selection function
SD	standard deviation
SUI	space use index
TPI	topographic position index
UTM	Universal Transverse Mercator

Spatially Explicit Modeling of Greater Sage-Grouse (*Centrocercus urophasianus*) Habitat in Nevada and Northeastern California—A Decision-Support Tool for Management

By Peter S. Coates[1], Michael L. Casazza[1], Brianne E. Brussee[1], Mark A. Ricca[1], K. Benjamin Gustafson[1], Cory T. Overton[1], Erika Sanchez-Chopitea[1], Travis Kroger[1], Kimberly Mauch[1], Lara Niell[2,3], Kristy Howe[1], Scott Gardner[4], Shawn Espinosa[3], and David J. Delehanty[5]

Abstract

Greater sage-grouse (*Centrocercus urophasianus*, hereafter referred to as “sage-grouse”) populations are declining throughout the sagebrush (*Artemisia* spp.) ecosystem, including millions of acres of potential habitat across the West. Habitat maps derived from empirical data are needed given impending listing decisions that will affect both sage-grouse population dynamics and human land-use restrictions. This report presents the process for developing spatially explicit maps describing relative habitat suitability for sage-grouse in Nevada and northeastern California. Maps depicting habitat suitability indices (HSI) values were generated based on model-averaged resource selection functions informed by more than 31,000 independent telemetry locations from more than 1,500 radio-marked sage-grouse across 12 project areas in Nevada and northeastern California collected during a 15-year period (1998–2013). Modeled habitat covariates included land cover composition, water resources, habitat configuration, elevation, and topography, each at multiple spatial scales that were relevant to empirically observed sage-grouse movement patterns. We then present an example of how the HSI can be delineated into categories. Specifically, we demonstrate that the deviation from the mean can be used to classify habitat suitability into three categories of habitat quality (high, moderate, and low) and one non-habitat category. The classification resulted in an agreement of 93–97 percent for habitat versus non-habitat across a suite of independent validation datasets. Lastly, we provide an example of how space use models can be integrated with habitat models to help inform conservation planning. In this example, we combined probabilistic breeding density with a non-linear probability of occurrence relative to distance to nearest lek (traditional breeding ground) using count data to calculate a composite space use index (SUI). The SUI was then classified into two categories of use (high and low-to-no) and intersected with the HSI categories to create potential management prioritization scenarios based on

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information about sage-grouse occupancy coupled with habitat suitability. This provided an example of a conservation planning application that uses the intersection of the spatially-explicit HSI and empirically-based SUI to identify potential spatially explicit strategies for sage-grouse management. Importantly, the reported categories for the HSI and SUI can be reclassified relatively easily to employ alternative conservation thresholds that may be identified through decision-making processes with stake-holders, managers, and biologists. Moreover, the HSI/SUI interface map can be updated readily as new data become available.

Introduction

Greater sage-grouse (*Centrocercus urophasianus*, hereafter referred to as "sage-grouse") are considered an umbrella (Rich and Altman, 2001; Rich and others, 2005; Rowland and others, 2006) or indicator species for the ecological integrity of sagebrush (*Artemisia* spp.) ecosystems due to the dependence of sage-grouse on sagebrush habitat, as well as their propensity to occupy sagebrush habitat across large spatial scales during the course of seasonal self-maintenance needs and reproduction (Knick and Connelly, 2011). Sage-grouse populations have declined concomitantly with the loss, degradation, and fragmentation of sagebrush ecosystems (Knick and Connelly, 2011), and currently (circa 2014) occupy slightly more than one-half of their former range across Western North America (Schroeder and others, 2004; Miller and others, 2011). Accordingly, sage-grouse have been identified as a candidate species for listing under the Endangered Species Act (U.S. Fish and Wildlife Service, 2010).

Sage-grouse in Nevada and northeastern California represent more than 25 percent of the present range-wide distribution of the species. Hence, empirically-based analytical tools that inform management decisions within Nevada and California are needed, especially where state and local resource managers have site-specific information that could be incorporated into a data-driven analytical tool for managers. One approach to aid sage-grouse management would be to develop an analytical tool that uses data replicated across broad geographical ranges to inform landscape level decisions, but that also can then be downscaled to inform local management decisions.

Currently available computational tools now allow for greater quantification of probabilistic habitat use at multiple spatial scales. In particular, habitat suitability indices (HSIs) generated from resource selection functions (RSFs) are powerful empirical quantifications that simultaneously consider habitat characteristics with animal distribution. Furthermore, these values can be measured at multiple local sites and then be used to project the relative probability of species occurrence across broader and un-sampled areas as a function of habitat characteristics (Boyce and McDonald, 1999; Manly and others, 2002).

The utility of Geographic Information System (GIS)-derived HSIs for understanding sage-grouse ecology has been facilitated by the increased availability of remotely sensed imagery used to accurately classify vegetation types across large geographic areas in conjunction with the availability of large datasets of sage-grouse locations generated from monitoring radio-marked sage-grouse (Aldridge and others, 2012). Moreover, coupling HSI values with predictions of sage-grouse occurrence based on space use models and indices (for example, Doherty and others, 2010a; Coates and others, 2013) will assist managers in recognizing the relative importance of particular areas to sage-grouse. For example, an understanding of the distribution and density of breeding sage-grouse at lek sites (that is, traditional breeding grounds) can aid in region-wide management of sage-grouse by targeting actions in areas with high quality habitat coupled with information on how sage-grouse use the habitat spatially and seasonally.

This report describes the process used to develop a region-wide habitat suitability map for sage-grouse within the southwestern portion of sage-grouse range (that is, Nevada and northeastern California). Because, variation in habitat composition across the sage-grouse range influences sage-grouse populations, this map was generated using averaged parameter estimates from RSFs informed by telemetry location data across 12 project areas with data that range 15 years. We then describe a method for applying a quantitative approach to conservation planning based on the simultaneous consideration of objectively categorized HSI values and space use indices (SUIs) derived from lek location data. The goal was to employ empirical information to evaluate different management scenarios for areas where sage-grouse conservation is a management goal. These scenarios can take many forms. For example, quantification could help to identify core areas to conserve sagebrush habitat with an emphasis on areas occupied frequently by sage-grouse, or help to identify conservation priorities and management actions for less suitable habitat, or suitable yet unoccupied habitat. Importantly, the indices created through the analytical processes described can be reclassified easily to incorporate alternative thresholds for conservation such as those that arise through decision-making processes with stake-holders, managers, and biologists. This work was completed in partnership with the State of Nevada Sagebrush Ecosystem Technical Team, the Nevada Department of Wildlife (NDOW), the Bureau of Land Management, and the California Department of Fish and Wildlife (CDFW).

Methods and Results

Overview and Conceptual Models

The quantitative approach to develop a spatially explicit support tool for conservation planning consisted of multiple steps that we describe in detail below and outline in a conceptual model (fig. 1). The overall modeling framework comprised input data sets (blue rectangular boxes) that were subjected to a series of processing steps (black rounded boxes) to produce interim and final spatially explicit maps (red parallelograms) (fig. 1).

First, we compiled sage-grouse telemetry location data from multiple areas across Nevada and northeastern California, and divided these data into three independent sets for the purposes of model training (80 percent of locations), mapping classification (10 percent), and map validation (10 percent) (*see: ‘Habitat Suitability Model Development’*). The training data set was linked spatially with corresponding environmental covariates to enable calculation of population-level RSFs (Manly and others, 2002) within 12 subregions with adequate data. To achieve this, we first identified the relevant spatial scale and linear relationships of environmental characteristics. Next, model-averaged parameter estimates for influential covariates among all candidate models were calculated to account for model selection uncertainty (Burnham and Anderson, 2002) (*see ‘RSF Analyses’*). We then used those estimates to develop spatially explicit models reflecting the relative probability of selection at each subregion. For each of the 12 subregional RSF models, we: (1) transformed the model into an HSI; (2) extrapolated the HSI across the extent of the region; and (3) averaged the HSI predictions generated from each subregion to provide an unbiased region-wide HSI map. The independent classification telemetry data set was then used to extract the region-wide HSI predictions and categorize the continuous HSI value based on the mean and variance of the extracted data that resulted in a region-wide categorical habitat map grouped into four hierarchical classes of descending probability of selection. The third independent data set was used to validate the region-wide map by calculating the proportion of locations within each category. We calculated these proportions for telemetry data within each of the training subregions and telemetry data from multiple independent subregions (that is, non-RSF subregions). Data from independent subregions were used for the purpose of assessing the map in interpolated areas. Locations of active leks were used as an additional dataset for map validation (*see*: '*Region-wide Habitat Suitability Index and implementation for Conservation Planning*').

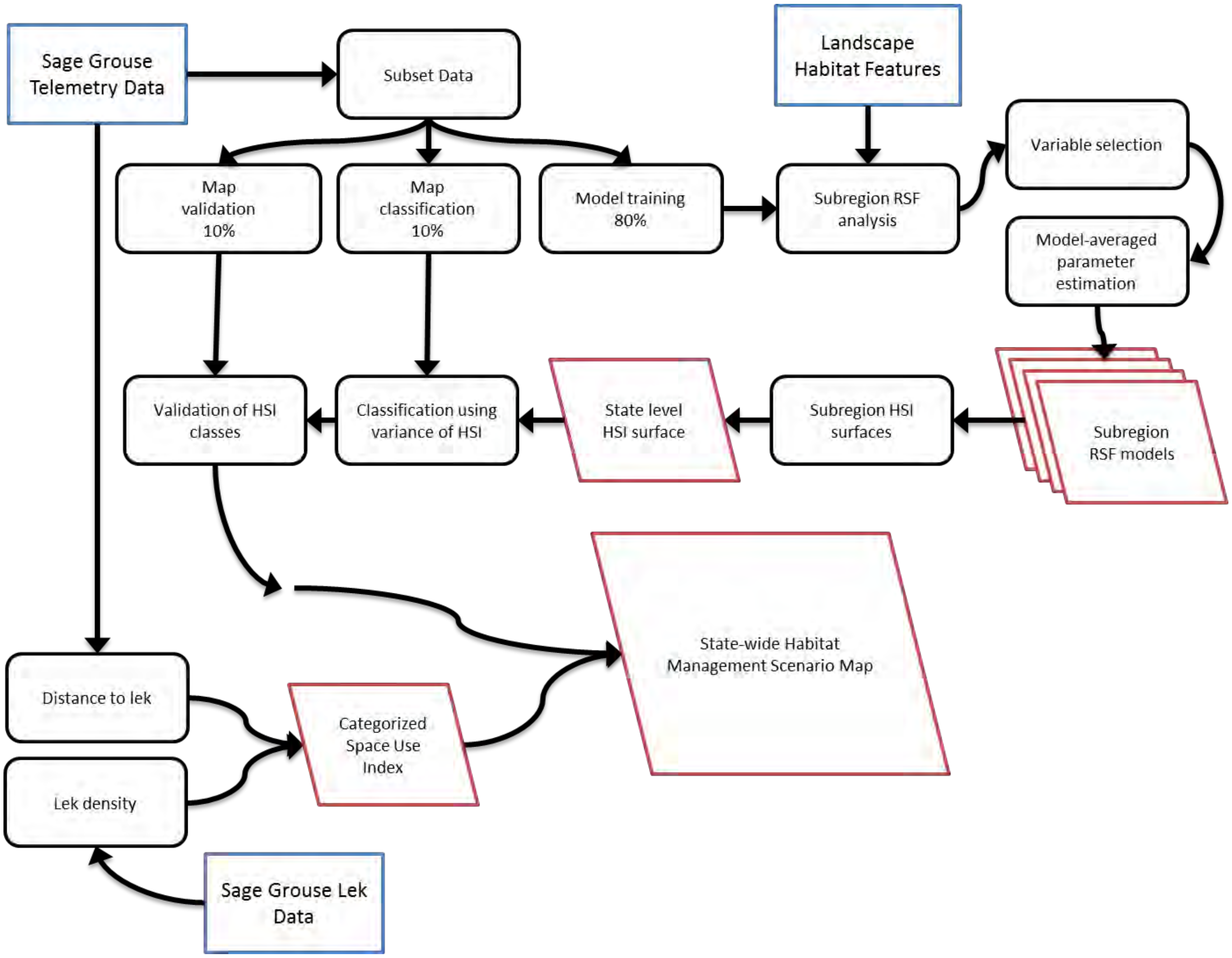

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Figure 1. Diagram showing conceptual model for a statewide greater sage-grouse (*Centrocercus urophasianus*) habitat suitability model and habitat management scenario map, Nevada and northeastern California. Input datasets (blue rectangular boxes) were subjected to a series of processing steps (black rounded boxes) to produce interim and final spatially explicit maps (red parallelograms). HSI, habitat suitability index; RSF, resource selection function; %, percent.

From the RSFs, information about the probability of selection was produced solely on predicted associations of sage-grouse with environmental covariates. However, the model does not incorporate knowledge of sage-grouse abundance and density that represents space occupied currently by sage-grouse. Therefore, a SUI was created based on lek count data and existing information regarding how sage-grouse use space in relation to leks. Specifically, the SUI integrated information on lek density, lek size (that is, average number of males attending leks), and the non-linear relation between probability of space use and distance to lek, which was then used to create categories of high use or low-to-no use across the region. To provide a modeling tool that can aid conservation planning, the region-wide HSI (categorized into high, moderate, low, and non-habitat based on the variance distribution of HSI values) and high and low-to-no use SUI categories were combined into a single region-wide map. This map simultaneously reflects both the presence of sage-grouse and the presence of habitat features associated with sage-grouse occupancy, and can then be used to prioritize areas for different management scenarios. The strength of this map is to account for characteristics that describe the quality of the environment for sage-grouse as well as an index of population abundance. This technique can be used to aid decision-making processes across the landscape (*see 'Implementation of the Region-wide HSI map for Conservation Planning: An Example'*).

Habitat Suitability Model Development

Delineating the Region-Wide Scale.

The region-wide extent of the project area was defined by using the outer perimeter of all combined sage-grouse Population Management Units (PMU; Nevada Department of Wildlife, 2014) in Nevada and northeastern California plus a 10-km buffer (fig. 2). This approached yielded an area of 21.5 million hectares that approximated the total potential sage-grouse range in Nevada and California (excluding the Bi-State Distinct Population Segment on the eastern side of the central Sierra Nevada Mountains). The purpose of the buffers was to ensure adequate representation of available habitats to sage-grouse at and near the PMU boundaries. Floristically, the region was typical of the Great Basin with Wyoming big sagebrush (*Artemesia tridentata* ssp. *wyomingensis*) and black (*Artemesia nova*) and low (*Artemesia arbuscula*) sagebrush occurring at elevations below 2100 m, and with mountain big sagebrush (*Artemesia tridentata* ssp. *Vaseyana*) occurring more frequently at higher elevations. Common non-sagebrush shrubs included rabbitbrush (*Chrysothamnus* ssp.), Mormon tea (*Ephedra viridis*), snowberry (*Symphoricarpos* ssp.), western serviceberry (*Amelanchier alnifolia*), and antelope bitterbrush (*Purshia tridentata*). Conifer forests were most frequently comprised of single-leaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) (hereafter, "pinyon-juniper"). Non-native and highly invasive annual grasses included cheatgrass (*Bromus tectorum*) and medusahead rye (*Taeniatherum caput-medusae*). Native perennial grasses included needle and thread (*Hesperostipa comata*), Indian ricegrass (*Achnatherum hymenoides*), and squirreltail (*Elymus elymoides*).

Sage-Grouse Telemetry Data.

Data used in the study were generated from several sage-grouse telemetry studies across Nevada and northeastern California conducted from 1998 through 2013 by USGS, NDOW, CDFW, Idaho State University, University of Idaho, and University of Nevada-Reno. Field data collection protocols for tracking and locating sage-grouse were generally consistent across sites and years. Data were excluded from the analyses in situations where data collection procedures or supporting information differed substantially from norms. For example, telemetry data were removed from the analyses when a unique bird identifier or location date was absent or birds had less than two locations total.

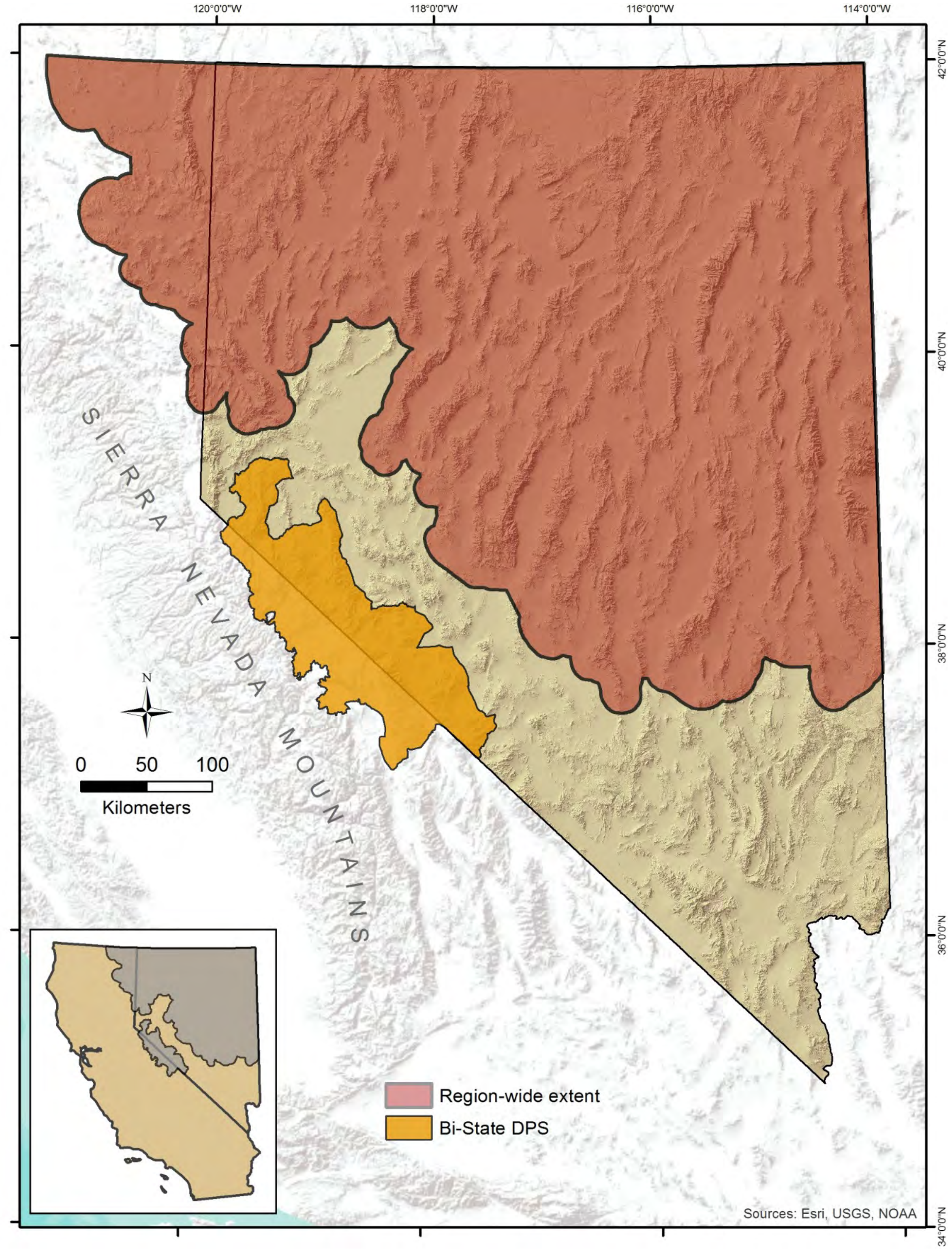

Figure 2. Map showing project area, which included the segment of greater sage-grouse (*Centrocercus urophasianus*) range in Nevada and northeastern California, excluding the Bi-State Distinct Population Segment (Bi-State DPS).

Generally, sage-grouse were captured in close proximity to leks in spring (March–April) and at various areas where sage-grouse congregate in autumn (October–December) using spotlighting techniques at night (Giesen and others, 1982; Wakkinen and others, 1992). Captured sage-grouse were outfitted with necklace-style VHF radio-transmitters (Kolada and others, 2009). Over the 15-year period (1998–2013), personnel across agencies and organizations conducted on-the-ground monitoring of sage-grouse. In lieu of VHF only radio-transmitters, a subsample of sage-grouse at some sites during 2012 and 2013 were outfitted with a combined Global Positioning Systems (GPS) - Platform Transmitter Terminals (PTTs; North Star Science and Technology, LLC, King George, Virginia) and VHF transmitter system. This system had a combined weight or less than 3 percent of sage-grouse body mass. The purpose of the GPS transmitter was to collect locations remotely, and the PTT transmitted stored location data via satellite communication to a central database. The VHF marked sage-grouse were relocated using hand-held radio receivers and antennas, whereby ground observers circled sage-grouse at a radius of 30–50 m and used the loudest signal method to minimize location error. Location coordinates for VHF-marked sage-grouse were obtained using a hand-held GPS (Universal Transverse Mercator, UTM).

Both VHF and GPS - PTT telemetry data were used in our analyses, and were screened for completeness and comparability prior to inclusion in models. GPS - PTT transmitters were programmed to collect 9–12 locations per day. To prevent autocorrelation among GPS - PTT location data, only a single random location per day (during daylight hours) was used in our analyses, and the remaining daily locations were removed. In total, 35,883 telemetry locations from 1,612 sage-grouse were compiled into a region-wide database for all analyses. The majority of locations from marked sage-grouse were obtained within a single year (that is, few unique grouse were marked across multiple years). All locations were generated from adult sage-grouse (that is, older than 1 year of age) of each sex across all seasonal life stages.

Sage-grouse telemetry locations were divided into three independent data subsets for use in different steps of model processing and validation. These data sets were considered independent in that no telemetry locations across sets were shared by the same individual. Thus, different sage-grouse were used for each data set. These data sets consisted of: (1) an RSF model training subset employing 80 percent of location data; (2) a classification subset employing 10 percent of location data to delineate areas of differing habitat quality; and (3) a validation subset employing 10 percent of location data from RSF subregions to assess predictiveness and consistency of habitat quality areas. Individual sage-grouse were randomly assigned to these three categories at the given proportions.

Delineating Subregions.

Spatial associations between marked sage-grouse and existing PMU boundaries (Nevada Department of Wildlife, 2014) were used as an initial starting point for delineating subregions for habitat selection analyses and naming conventions across Nevada and northeastern California (fig. 3). Ultimately, the data were partitioned into 19 subregions based on movement patterns of individual radio-marked sage-grouse for habitat analyses, with each grouse occupying one subregion only. Some subregions contained too few marked sage-grouse for sufficient training data to develop a habitat model, which resulted in the exclusion of seven subregions with fewer than 20 marked sage-grouse or less than 100 telemetry locations. However, data from these excluded ‘non-RSF’ subregions were sufficient to provide further validation of the region-wide model in areas that were not used to train the model (*see*

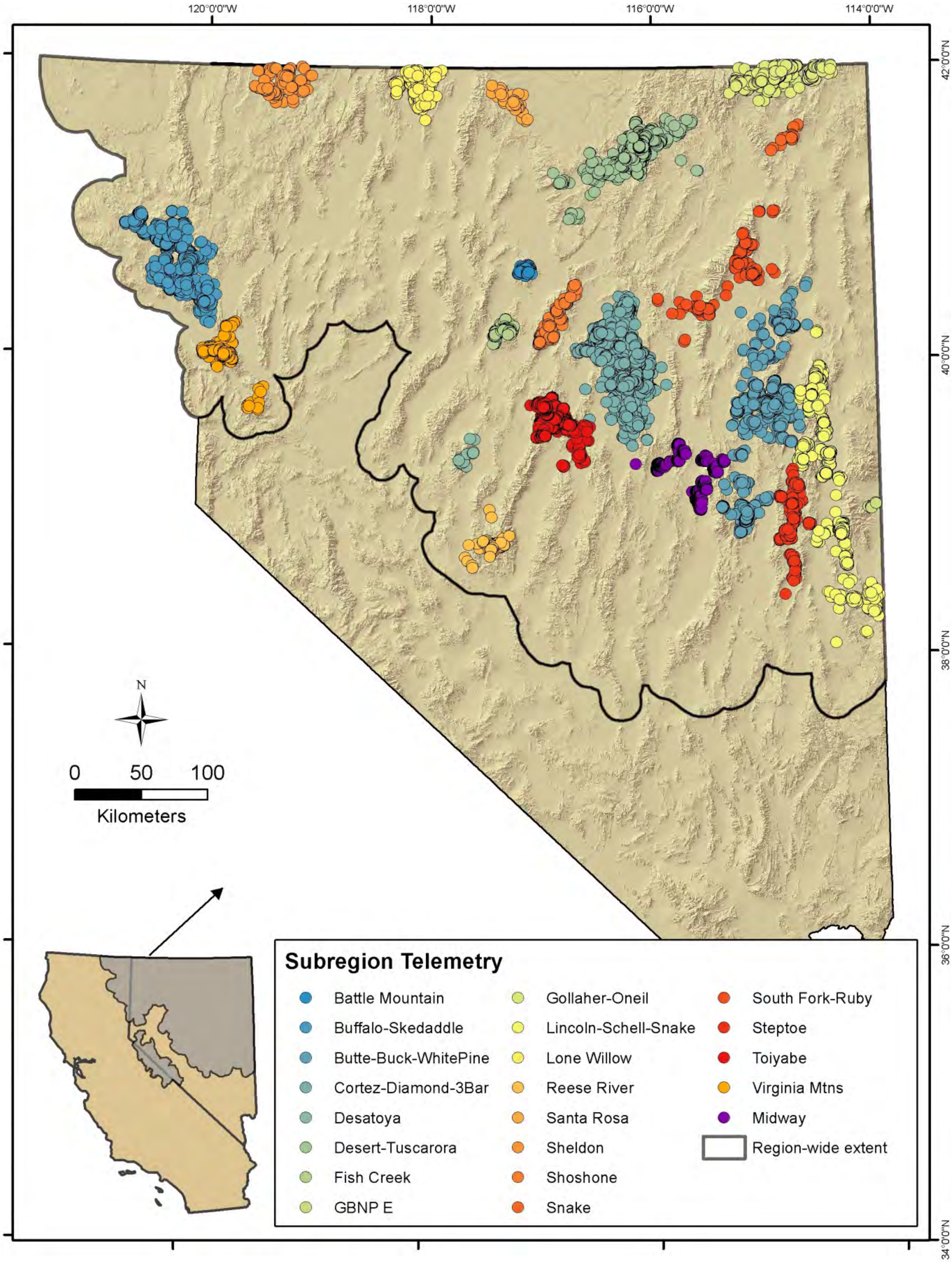

Figure 3. Map showing telemetry points (colored dots) comprising greater sage grouse (*Centrocercus urophasianus*) locations available for use in resource selection function modeling, Nevada and northeastern California. Names refer to locations associated with NDOW Population Management Units.

'HSI Classification and Validation'). After data-screening, we included telemetry data from 12 subregions in the habitat training models: Buffalo-Skedaddle, Butte-Buck-White Pine, Cortez, Desert-Tuscarora, Gollaher-O'Neil, Lincoln-Schell-Snake, Lone Willow, Midway, Sheldon, South Fork-Ruby Valley, Toiyabe, and Virginia Mountains (fig. 4). The spatial extent of habitat availability for use in habitat modeling was defined by first calculating a minimum convex polygon (MCP) that encompassed all telemetry locations within each subregion, and then buffering each MCP by the maximum average daily sage-grouse movement (1,451 m). Using the MCP to identify the study extent is a common and useful approach for habitat studies (Aebischer and others, 1993), and buffering by the maximum average daily movement helps ameliorate underestimation of habitat availability.

Classification of Landscape Habitat Features.

A broad suite of biotic and abiotic variables potentially associated with sage-grouse occurrence was quantified to provide inputs to estimated HSIs as spatially explicit environmental covariates. Land-cover types representing the dominant vegetation within 30 x 30 m pixels were classified into binary raster layers using existing mapping products. For Nevada, detailed land cover classes were derived from the Nevada SynthMap (Peterson, 2008). Land cover classes were then reclassified into broad habitat categories that were guided by classification levels from NatureServe (NatureServe, 2013), Landscape Fire and Resource Management Planning Tools (LANDFIRE) (2010), and The Nature Conservancy. Land cover classes for the northeastern California portion of the project area were derived from LANDFIRE, SageStitch (Comer and others, 2002), and California Department of Forestry and Fire Protection (2006) data sets. To facilitate region-wide compatibility across land cover classes, each data set was reclassified into the broadest categories used to reclassify the Nevada SynthMap, and then compared across pixels. Pixel values that matched for at least two of the data sets were chosen, whereas the reclassified LANDFIRE value was used when no agreement occurred. The final Nevada and northeastern California layers were then merged. The final set of non-sagebrush land cover classes used in the analysis comprised annual grass, perennial grass, lowland non-sagebrush shrub, upland non-sagebrush shrub, wet meadow, riparian, pinyon-juniper conifer, non-pinyon-juniper conifer (forest), agricultural cropland, and bare ground. All sagebrush species (for example, Wyoming big, mountain big, low, and three-tip [*Artemisia tripartita*]) were ultimately condensed into a single "sagebrush" land cover class for analysis (table 1).

Because variation in sage-grouse habitat selection can be strongly scale-dependent (Aldridge and Boyce, 2007; Doherty and others, 2008; Casazza and others, 2011; Aldridge and others, 2012), the analysis was performed on each land cover raster at three different spatial scales relevant to sage-grouse movement patterns. Specifically, the scale-dependent analysis used a circular moving window (neighborhood analysis tool, ArcGIS™ Spatial Analyst) with a radius of 167.9 m (8.7 ha), 439.5 m (61.5 ha), or 1,451.7 m (661.4 ha) that represented averages across sage-grouse of the minimum, mean, and maximum daily distance traveled by sage-grouse in this study, respectively, to calculate the proportion of a particular habitat within a respective spatial scale. Other land cover related variables measured at the three spatial scales included variety of land cover types (that is, the number of unique land cover types), variety of edge types (that is, the number of unique combinations of adjacent land cover types), and the amount of edge, quantified as the total number of pixels that represented interface of two adjacent cover types (hereafter, "edge effect") (table 1).

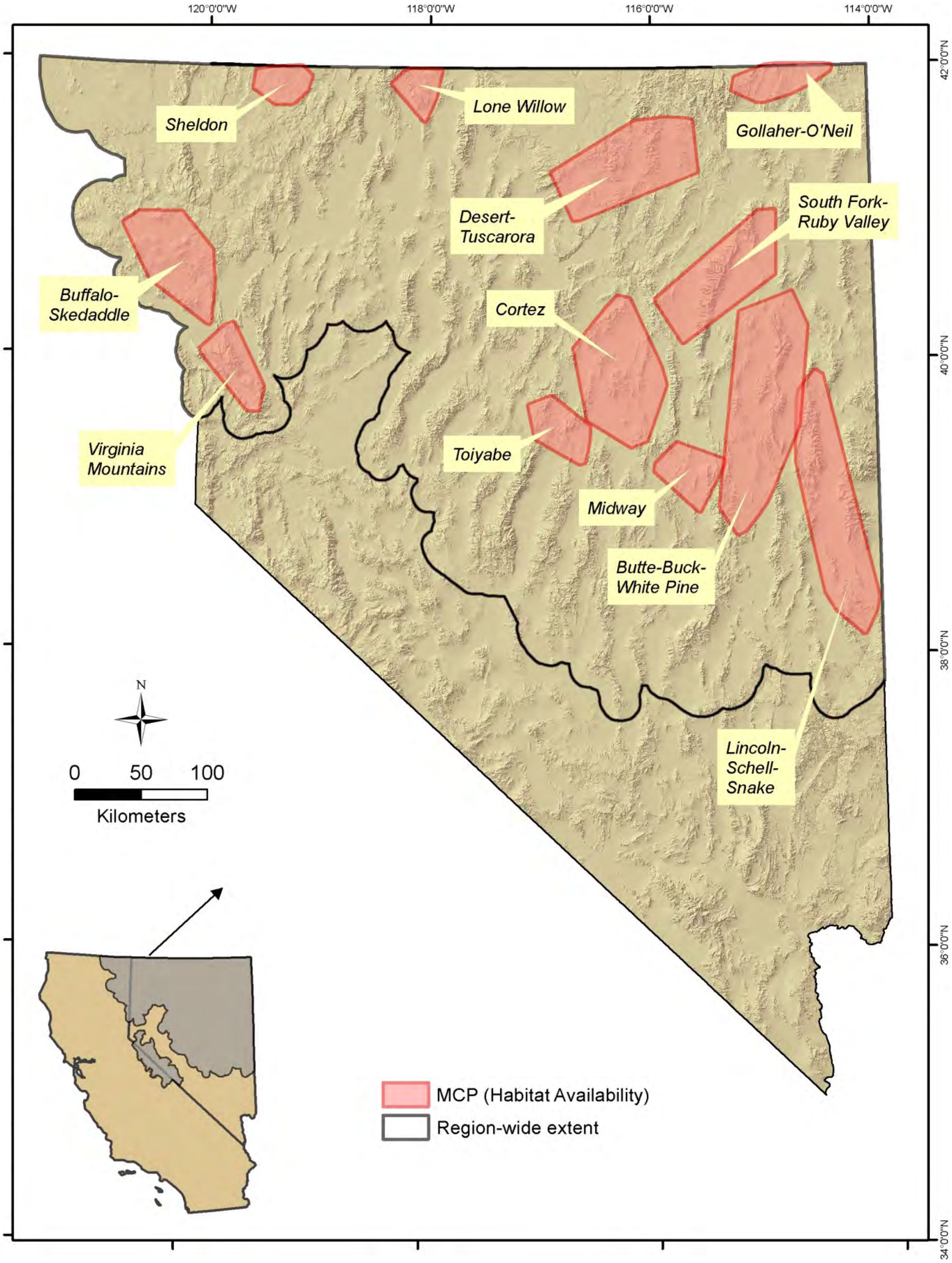

Figure 4. Map showing 12 subregions with suitable greater sage-grouse (*Centrocercus urophasianus*) location data for resource selection function analyses, Nevada and northeastern California.

Table 1. Proposed variables assessed in resource selection function model development for each subregion, Nevada and northeastern California.

[ha, hectare; m, meter]

Variable type	Scales		
Land cover			
Annual grass	8.7 ha	61.5 ha	661.4 ha
Agriculture	8.7 ha	61.5 ha	661.4 ha
Bare ground	8.7 ha	61.5 ha	661.4 ha
Sagebrush	8.7 ha	61.5 ha	661.4 ha
Forest	8.7 ha	61.5 ha	661.4 ha
Lowland shrubs	8.7 ha	61.5 ha	661.4 ha
Perennial grass	8.7 ha	61.5 ha	661.4 ha
Pinyon-juniper	8.7 ha	61.5 ha	661.4 ha
Riparian	8.7 ha	61.5 ha	661.4 ha
Upland shrubs	8.7 ha	61.5 ha	661.4 ha
Wet meadow	8.7 ha	61.5 ha	661.4 ha
Habitat configuration			
Edge effects	8.7 ha	61.5 ha	661.4 ha
Variety of edge types	8.7 ha	61.5 ha	661.4 ha
Variety of land cover types	8.7 ha	61.5 ha	661.4 ha
Distance to edge	Linear	Exponential decay	
Distance to agriculture	Linear	Exponential decay	
Water sources			
Any stream	Linear	Exponential decay	
Perennial stream	Linear	Exponential decay	
Intermittent stream	Linear	Exponential decay	
Spring	Linear	Exponential decay	
Water body	Linear	Exponential decay	
Wet meadow	Linear	Exponential decay	
Topography			
Elevation	Linear		
Roughness index	1 ha		
Topographic position index	510 m	2,010 m	

Distance Metrics, and Topographic Indices.

Distances to landscape features that may affect the probability of sage-grouse use were calculated from the GIS (table 1). These landscape features included various water features, agricultural development, and habitat edge (table 1). The influence of distance to water was measured using multiple landscape features from the National Hydrography Dataset (U.S. Geological Survey, 2014) that included perennial streams, intermittent streams, springs, and open water bodies. Distance to wet meadows was also measured, as identified by the land cover maps. For all landscape features, linear distance was calculated as a simple Euclidean distance from a used or available point using the Distance tool in Spatial Analyst (ArcGIS™ 10.1). Non-linear relationships were assessed with an exponential decay function, $e^{-d/\alpha}$, where d was the Euclidean distance from a used or available point to a landscape feature, and α was the mean linear distance from that feature. This decay function allowed estimation of the degree to which the effect of a habitat feature strengthened or weakened with increasing distance from that feature. A metric estimating the distance to road was also calculated but not included in the set of variables because the sage-grouse locations obtained by hand-held VHF were closer to roads than those obtained by GPS-PTT and could result in biased results across data sources (P.S. Coates, U.S. Geological Survey, unpub. data, 2014).

Topographic characteristics were calculated to assess the probability of sage-grouse use with several indices. Elevation and topographic roughness (within 30 x 30 m pixels) were determined from the National Elevation Dataset (U.S. Geological Survey, 2009). Topographic roughness, which measures variance in elevation change (Riley and others, 1999), was calculated using the Geomorphometry and Gradient Metrics Toolbox (Evans and Oakleaf, 2012) and normalized by dividing each pixel value by the maximum value. Topographic position indices (TPI; Jenness, 2006) were calculated as the difference between elevation at a central point and the surrounding average elevation within radii of 510 and 2,010 m. Positive and negative TPI values indicated central point elevations that were higher and lower than the surrounding area, respectively, and depressions or valleys can represent areas of increased moisture (De Reu and others, 2013).

Values of all landscape habitat features, distance metrics, and topographic indices were extracted from the GIS for input into the habitat selection analyses (*see 'Subregional RSF Modeling'*) at used locations (telemetry data) and random locations. The purpose of generating random locations was to characterize the environment available to sage-grouse populations. Five random locations within the buffered MCP were generated for every used location to account for heterogeneity of available land cover types (Aldridge and others, 2012).

RSF Analyses

Subregional RSF Modeling.

Resource selection functions (RSFs) are calculated frequently using data from wildlife telemetry studies. Typically, selection and avoidance for particular landscape features are estimated by contrasting measurements at used locations (telemetry data) with measurements at random locations that represent areas available to all individuals within a population (Boyce and McDonald, 1999; Manly and others, 2002; Johnson and others, 2006). We estimated population-level RSFs using generalized linear models with a binomial error distribution and specified logit-link function (that is, logistic regression) in a mixed effects model framework, where environmental variables (described above) were modeled as explanatory covariates (predictors). The number of sample locations was not equal across individual sage-grouse. Therefore, the individual sage-grouse was treated as a random effect (that is, random intercept) to account for potential autocorrelation among locations associated with each individual (Gillies and others, 2006). Year was also included as a random effect for those subregions with more than 1 year of telemetry data to account for temporal intraclass correlation. A weight of 0.2 was specified in the model structure for each random location that was used to characterize available habitat. This value allowed equal influence by used (weight = 1) and random points because 5 random points were generated per actual grouse location. To avoid seasonal sampling bias, we also added an additional weight to each location based on the proportion of use occurring during spring/summer (March–August), fall (September–November), and winter (December–February). The seasonal weight allowed all seasons to be represented equally. We fit all models using the lme4 package (Bates and others, 2012) in Program R (R-Core-Team, 2012).

A two-part selection procedure was employed to reduce the number of covariates. This procedure relied on bias-corrected Akaike's information criterion (AIC_c) (Burnham and Anderson, 2002) to identify the most parsimonious RSF model for each subregion. In the first part, proposal covariates (table 1; appendixes A– L) were used to determine the spatial scale, distance function, or topographic index that best approximated the probability of selection for each corresponding covariate relative to a null model (that is, random effect only) in an information-theoretic framework. The most appropriate fit for percent cover estimated at the three spatial scales (8.7 ha, 61.5 ha, or 661.4 ha) was evaluated for each land cover type. The most relevant distance function (linear or exponential decay) was evaluated for water features, edge habitat, and agriculture. All topographic measures were evaluated relative to a null model. Candidate covariates from models that represented the best performing scale/distance function were then carried forward providing that the model also outperformed the null model by greater than 2.0 ΔAIC_c units (Burnham and Anderson, 2002).

The second part of model development comprised a series of additive models containing all possible 2-covariate combinations of our "candidate" covariates carried over from the first stage. Models in this set estimated the effect (slope) of a covariate on probability of selection while accounting for the presence of all other covariates. We sought to reduce multicollinearity by constructing correlation matrices and removing models with evidence of correlated effects ($r \geq | 0.65 |$). We then calculated model-averaged parameter estimates (βs; appendixes A–L) for each covariate across the set of additive models to account for model selection uncertainty (Burnham and Anderson, 2002). The purpose of this stage was not to develop the most parsimonious additive model with multiple covariates, but instead estimate the effect of each covariate and use the model-averaged parameter estimates to calculate an RSF. Covariates were excluded when their model-averaged 95 percent confidence intervals overlapped zero. The RSF took the form:

$$\mathrm{w}(x) = exp(\beta_1 \mathrm{X}_1 + \beta_2 \mathrm{X}_2 +, \ldots, +\beta_{\mathrm{k}} \mathrm{X}_k) \quad (1)$$

where

$w(x)$ is the resource selection function (RSF), and

β is the averaged parameter estimate for each covariate ($\mathrm{X}_1, \ldots, \mathrm{X}_\mathrm{k}$) (Manly and others, 2002).

Although the RSF cannot be considered an absolute probability because unused areas were not known, the RSF is useful as a representation for the probability of selection (Manly and others, 2002).

Summary of Subregional RSF Results.

A total of 25 covariates were modelled in 12 subregional RSF analyses (table 2; appendixes A–L). Sixteen of these covariates were present in a majority of the subregional RSF models consisting of: (1) seven covariates characterizing land cover – sagebrush, lowland shrub, upland shrub, riparian, forest, pinyon-juniper, and perennial grass relative cover; (2) four covariates characterizing distance to water sources – nearest water body of any type, nearest spring, nearest wet meadow, and nearest perennial stream; and (3) six covariates characterizing land cover interfaces or abiotic features – amount of edge habitat, number of adjacent habitat types, topographic roughness, topographic position, and elevation.

While coefficient direction and magnitude for several covariates varied across subregions, some consistent patterns were evident in covariate coefficients that indicated use or avoidance of a covariate by sage-grouse (table 2; appendixes A–L). On average, 6.5 land cover covariates were present in final models for each subregion. The Sheldon subregion was the only notable exception, where just one cover type was retained in the final model. Sagebrush was selected by sage-grouse in all eleven subregions containing the sagebrush covariate, and pinyon-juniper and forest were avoided by sage-grouse in the subregions that contained those covariates (9 and 7 subregions, respectively). Strong correlations between pinyon-juniper and sagebrush did not occur among any subregions ($r < |0.65|$). Final RSF models in every subregion indicated selection for at least one type of water source. Some inconsistencies occurred among coefficients that represented relationships with agriculture across subregions, whereby use of agriculture ranged from selection, proportional use to availability, and avoidance. Effects related to either the amount of or distance to edge habitat were evident in RSFs for every subregion, but the magnitude of these effects varied among subregions. Edge types or land cover types were present in RSFs for all subregions except for the South Fork/Ruby Valley, and the direction of these effects were similar among subregions. A covariate that represented distance to some source of water was influential and, thus, included in every subregional RSF.

Table 2. Magnitude of significant model-averaged effects among 12 subregional resource selection function models for all proposed variables included in modeling of greater sage-grouse (*Centrocercus urophasianus*) habitat, Nevada and northeastern California.

[**Symbols**: +, positive RSF coefficient; -, negative RSF coefficient; 0, RSF coefficient confidence interval overlaps zero; V, topographic position index coefficient indicates selection for valleys]

		Subregion											
Group	Covariate	Buffalo-Skedaddle	Butte-Buck-White Pine	Cortez	Desert-Tuscarora	Gollaher - O'Neil	Lincoln-Schell-Snake	Lone Willow	Midway	Sheldon	South Fork-Ruby Valley	Toyiabe	Virginia
Land cover	Annual grass	0	0	0	-	0	0	0	-	0	-	-	+
	Bare ground	-	-	-	-	0	0	+	0	0	0	0	0
	Cropland	+	0	-	0	0	+	0	+	0	+	0	0
	Forest	-	-	0	-	-	-	0	-	0	-	0	0
	Lowland shrub	-	-	-	-	0	-	+	+	0	-	-	+
	Perennial grass	+	+	+	-	0	+	0	-	0	+	0	0
	Pinyon-juniper	-	-	-	-	0	-	0	-	0	-	-	-
	Riparian	-	+	-	-	-	-		-	0	0	+	-
	Sagebrush	+	+	+	+	+	+	+	+		+	+	+
	Upland shrub	-	+	-	-	-	-	-	0	-	0	+	0
	Wet meadow	-	0	0	0	0	0	0	0	0	0	0	0
Agriculture	Distance to cropland	0	+	0	+	0	0	0	0	0	0	-	-
Edge Effects	Edge effects	0	+	+	0	-	+	+	-	-	-	0	+
	Distance to edge	-	0	0	+	0	0	0	0	0	0	+	0
Landscape Variation	Variety of edge types	0	0	0	0	-	0	+	0	0	0	0	-

		Subregion											
Group	Covariate	Buffalo-Skedaddle	Butte-Buck-White Pine	Cortez	Desert-Tuscarora	Gollaher - O'Neil	Lincoln-Schell-Snake	Lone Willow	Midway	Sheldon	South Fork-Ruby Valley	Toyiabe	Virginia
	Variety of land cover types	-	+	+	-	0	+	0	+	-	0	+	0
Water Source	Distance to water body	+	+	+	+	+	+	+	+	+	-	+	-
	Distance to spring	-	-	+	+	-	+	+	+	0	-	+	+
	Distance to wet meadow	0	-	+	+	0	+	+	+	0	0	+	+
	Distance to nearest stream	0	0	0	-	0	0	0	0	0	+	0	0
	Distance to perennial stream	-	0	+	0	0	+	+	+	-	0	+	-
	Distance to intermittent stream	0	+	0	0	-	0	0	0	0	0	0	0
Topography	Roughness index	-	+	+	-	-	-	-	-	0	-	+	-
	Topographic position index	0	V	0	V	V	V	V	V	V	V	0	V
	Elevation	-	+	+	-	-	+	+	-	+	+	+	+

Region-Wide Habitat Suitability Index and Implementation for Conservation Planning

Region-Wide Average Habitat Suitability Surface Map.

The final RSF equation was applied for each subregion across all pixels in the region-wide extent using the Raster Calculator in Spatial Analyst. Because the subregional RSF consisted of extreme values, a monotonic transformation of the RSF was conducted, expressed as:

$$\mathrm{HSI} = \frac{w(x)}{1+w(x)}, \tag{2}$$

that resulted in subregional HSI surfaces. These HSI surfaces provided a relative metric of habitat quality for any given pixel where habitat quality reflects range-wide mean propensity to be used by sage-grouse given the attributes of the pixel. The HSI equation is equivalent to a logistic transformation on the $\beta_k X_k$, for each covariate X_k. However, the function was used only to express relative influence among different RSF values by expressing influence as a value between 0 and 1. Although we did not assume that HSI values represent absolute probabilities, an increase in HSI corresponds to an increase in the probability of selection. The subregional HSIs were averaged across each pixel to calculate a single continuous surface for the region. This was an appropriate technique for developing a region-wide HSI because it reduces the potential for non-typical selection patterns at a local site to influence HSI values elsewhere within the region. Further refinement by averaging across subregions at smaller scales is possible; however, we suspect that representation from 12 subregions is not broad enough to warrant further delineation. Our end result was a region-wide HSI surface that accounts for variability in predicted HSI values from each of the subregional areas (fig. 5).

Implementation of the Region-Wide HSI Map for Conservation Planning—An Example

Effective conservation planning is an inherent stakeholder-driven process, and stakeholders may use quantitative tools to aid decision making. Here, an example is provided for how a HSI continuous surface map can be used as a tool to aid conservation planning and the decision-making process. In this example, two categorized sources of information are employed to identify spatially explicit management areas: (1) suitability of landscape characteristics; and (2) likelihood of sage-grouse occurrence.

HSI Classification and Validation—An Example

The relative suitability of habitat occurring in an area may be obtained directly from the region-wide HSI map. However, the continuous index at each 30 x 30 m pixel provided by the map is an unwieldy mechanism for decision-making related to distinct areas, especially at relatively large scales. Therefore, it can be valuable to categorize the region-wide HSI surface into classes that represent habitat quality at larger spatial scales. To do this, pixels that represented large bodies of water (for example, lakes and reservoirs) identified from Landsat land cover classifications (that is, SynthMap) were first masked from the region-wide HSI. The region-wide HSI was then objectively binned into four discrete categories in multiple steps. First, HSI values were extracted using the 10 percent of independent telemetry locations that were intentionally withheld from the data set used to develop subregion RSFs. This data set comprised the 'map classification data set', as it represented data that were statistically independent of RSF outcomes. Second, four suitability categories were developed using cutoff values based on the standard deviation (SD) from the mean HSI ($\bar{x}$) derived from the map classification data set. For these purposes, we assumed the data arose from a normal distribution. High suitability habitat was comprised of all HSI values greater than 0.5 SD below $\bar{x}$. This constituted a percentile rank range of 30.9–100.0 percent of HSI values (fig. 6). Moderate suitability habitat was comprised of HSI values between 1.0 and 0.5 SD below $\bar{x}$, constituting a percentile rank range of 15.0–30.9 percent (fig. 7). Low suitability habitat was comprised of HSI values between 1.5 and 1.0 SD below $\bar{x}$, constituting a percentile rank range of 6.7–15.0 percent (fig. 8). Non-suitable habitat was comprised of HSI values 1.5 SD below $\bar{x}$ (less than 6.7 percent; fig. 9). The cutpoint of 1.5 SD was identified as the most appropriate value to determine the lowest threshold (non-habitat vs. habitat) using an ancillary analysis. Specifically, habitat areas were generated using cutpoints from SD of 0.5, 1.0, 1.5, and 2.0 below $\bar{x}$. For each successive SD cutpoint, we then calculated the ratio of percent potential habitat area gained to the percent of RSF telemetry points added. A curvilinear line between this ratio (y-axis) and SD cutpoint (x-axis) was fitted, and the point where the line intercepted 1.0 on the y-axis was closest to the 1.5 SD. This analysis indicated that cutpoints beyond 1.5 SD incorporated disproportionately fewer telemetry points per unit area (fig. 10). As further rationale for 1.5 SD, this value represents the 6.7 percentile of the HSI distribution. Assuming that sage grouse locations are normally distributed in relation to habitat quality and sampling was random, this value roughly corresponds to the 5-10 percent of time that sage-grouse may spend moving between seasonal habitats.

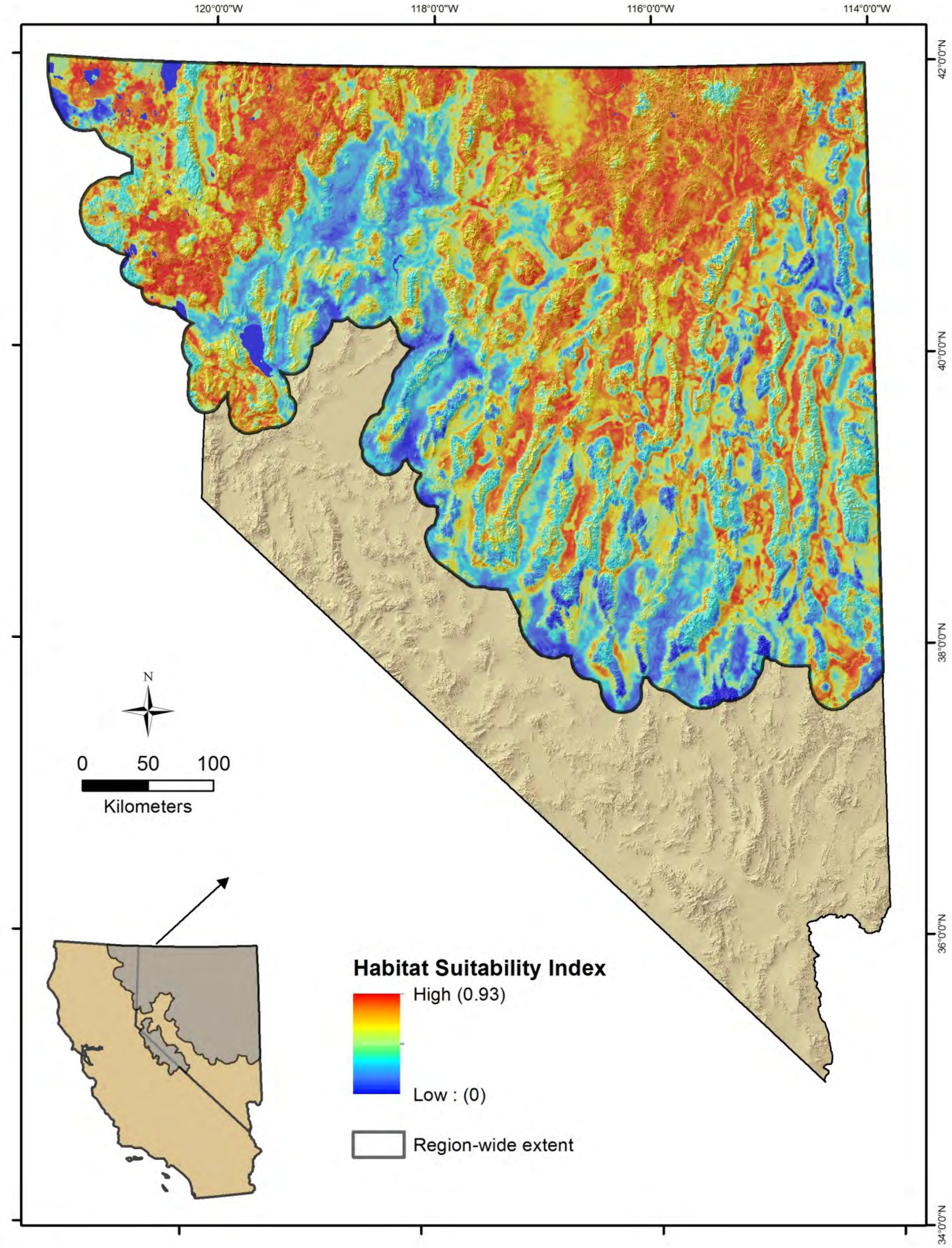

Figure 5. Map showing region-wide, model-averaged suitability map of greater sage-grouse (*Centrocercus urophasianus*) habitat derived from 12 subregions, Nevada and northeastern California.

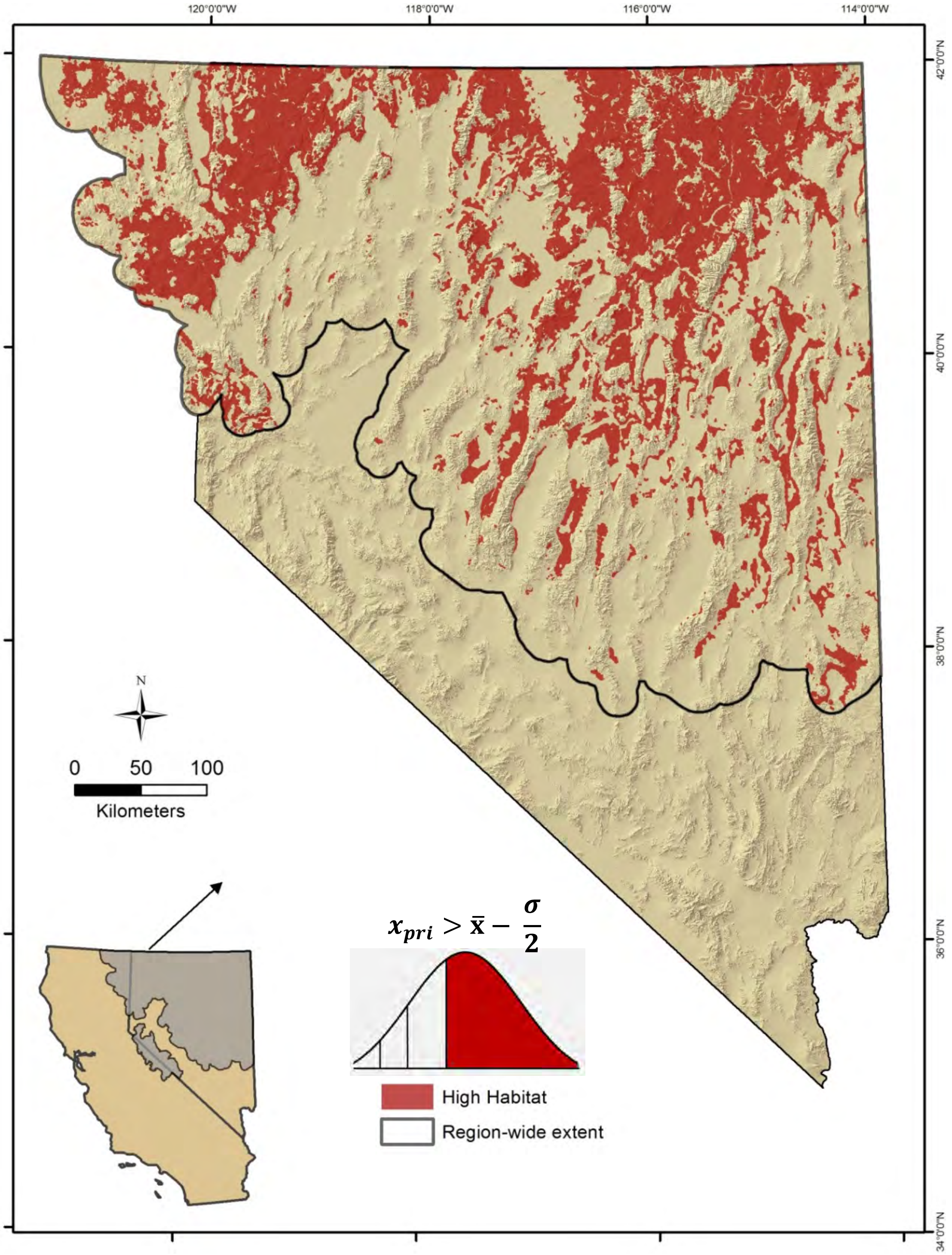

Figure 6. Map and graph (resource selection function [RSF] and probability distribution) showing example region-wide distribution of categorized high suitability habitat for greater sage grouse (*Centrocercus urophasianus*), Nevada and northeastern California. x_{pri} = classification as priority habitat; $\bar{x}$ = mean of the suitability values derived from classification data set; σ = standard deviation of suitability values derived from classification data set.

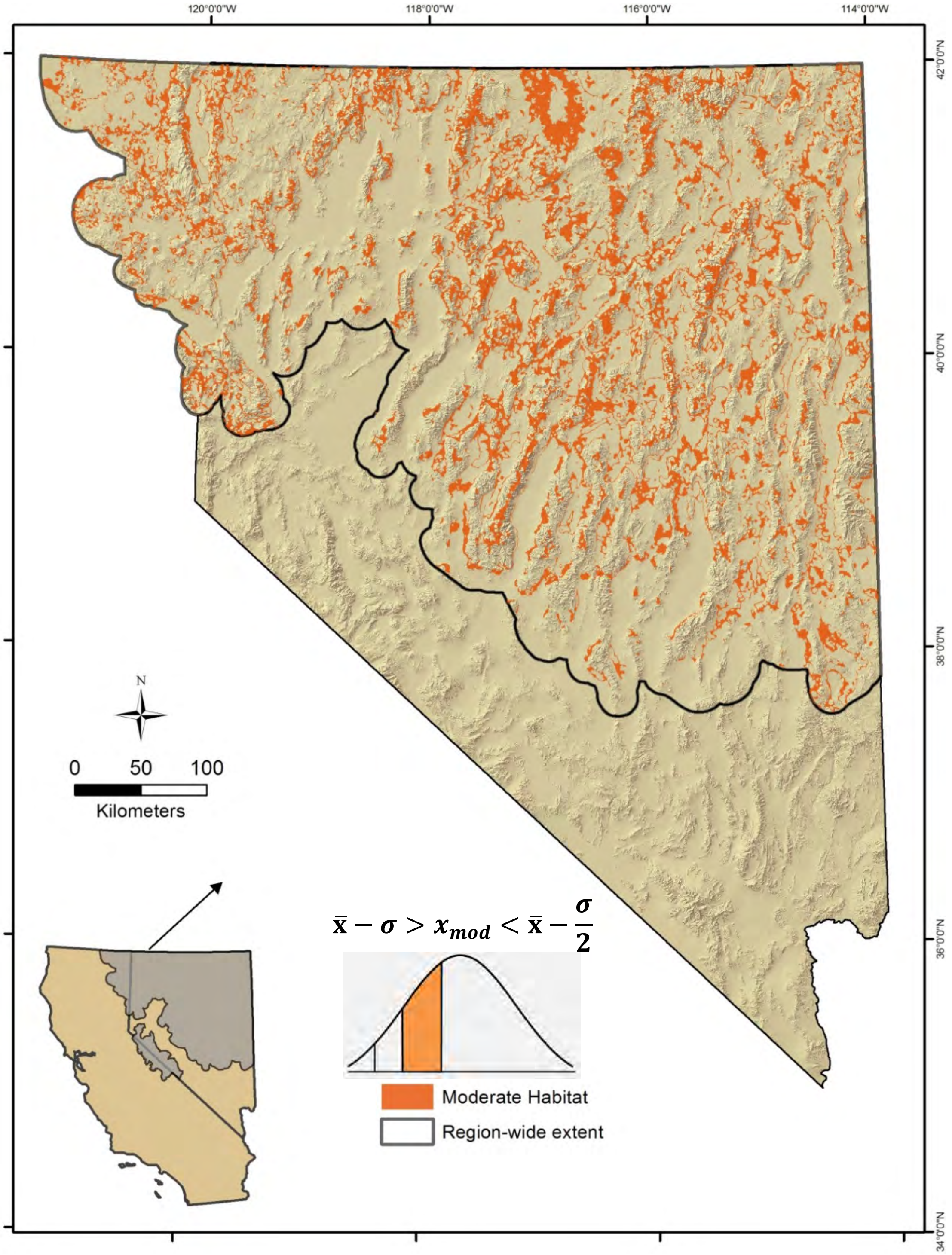

Figure 7. Map and graph (resource selection function [RSF] and probability distribution) showing example region-wide distribution of categorized moderate suitability habitat for greater sage grouse (*Centrocercus urophasianus*), Nevada and northeastern California. x_{mod} = classification as moderate habitat; $\bar{x}$ = mean of the suitability values derived from classification data set; σ = standard deviation of suitability values derived from classification data set.

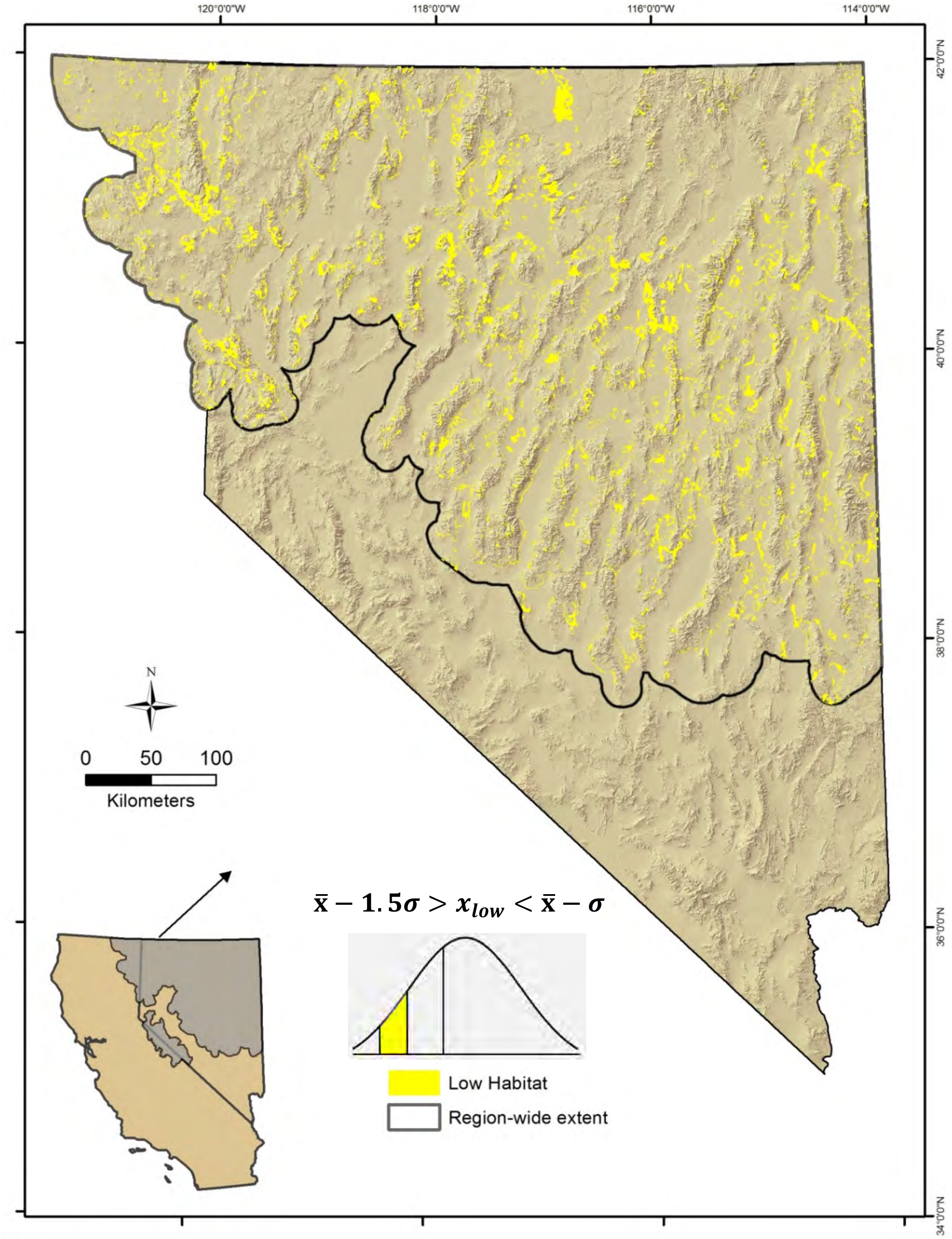

Figure 8. Map and graph (resource selection function [RSF] and probability distribution) showing example region-wide distribution of categorized low suitability habitat for greater sage grouse (*Centrocercus urophasianus*), Nevada and northeastern California. x_{low} = classification as low habitat; $\bar{x}$ = mean of the suitability values derived from classification data set; σ = standard deviation of suitability values derived from classification data set.

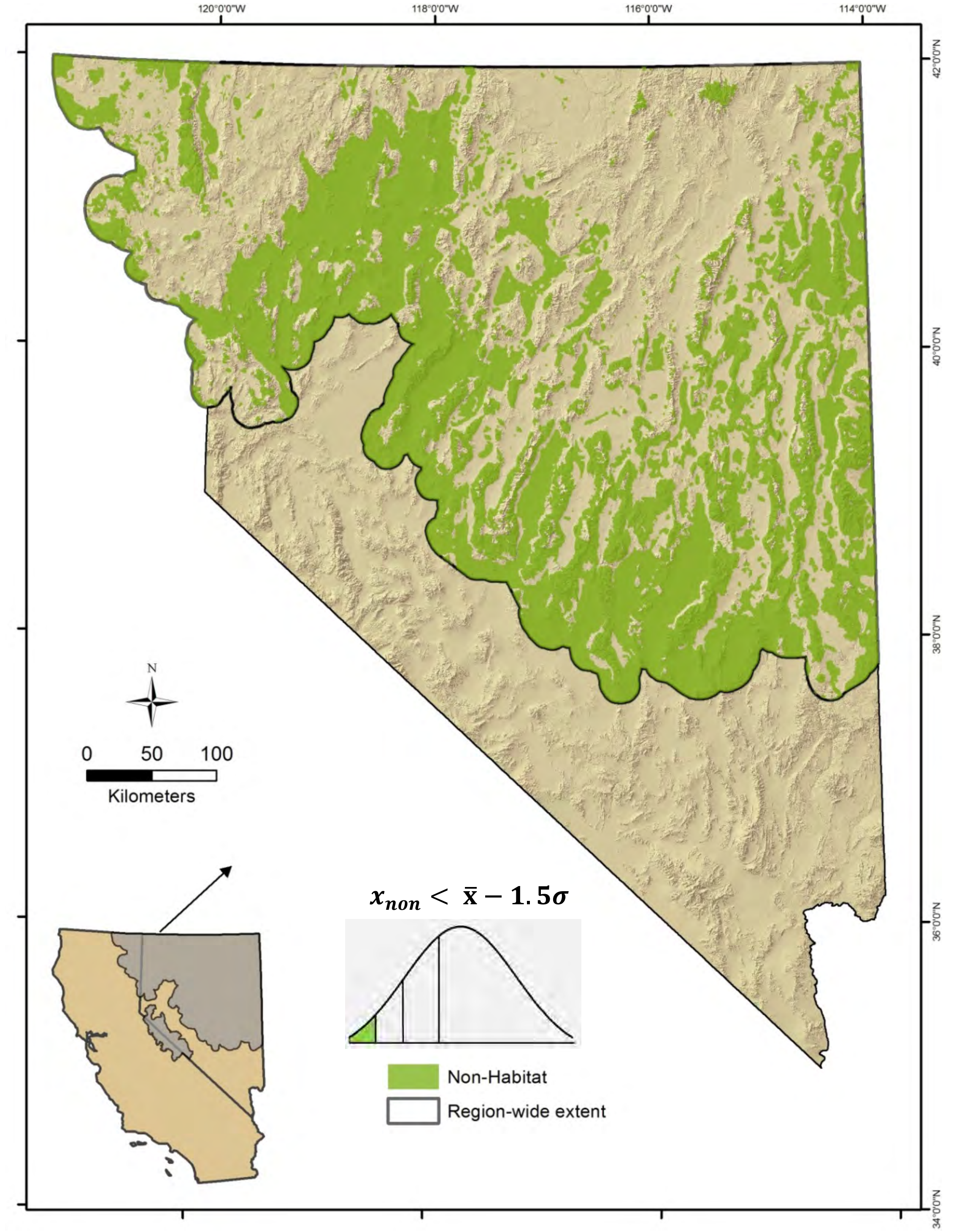

Figure 9. Map showing example region-wide distribution of categorized non-suitable habitat for greater sage grouse (*Centrocercus urophasianus*), Nevada and northeastern California. x_{non} = classification as non-habitat; $\bar{x}$ = mean of the suitability values derived from classification data set; σ = standard deviation of suitability values derived from classification data set.

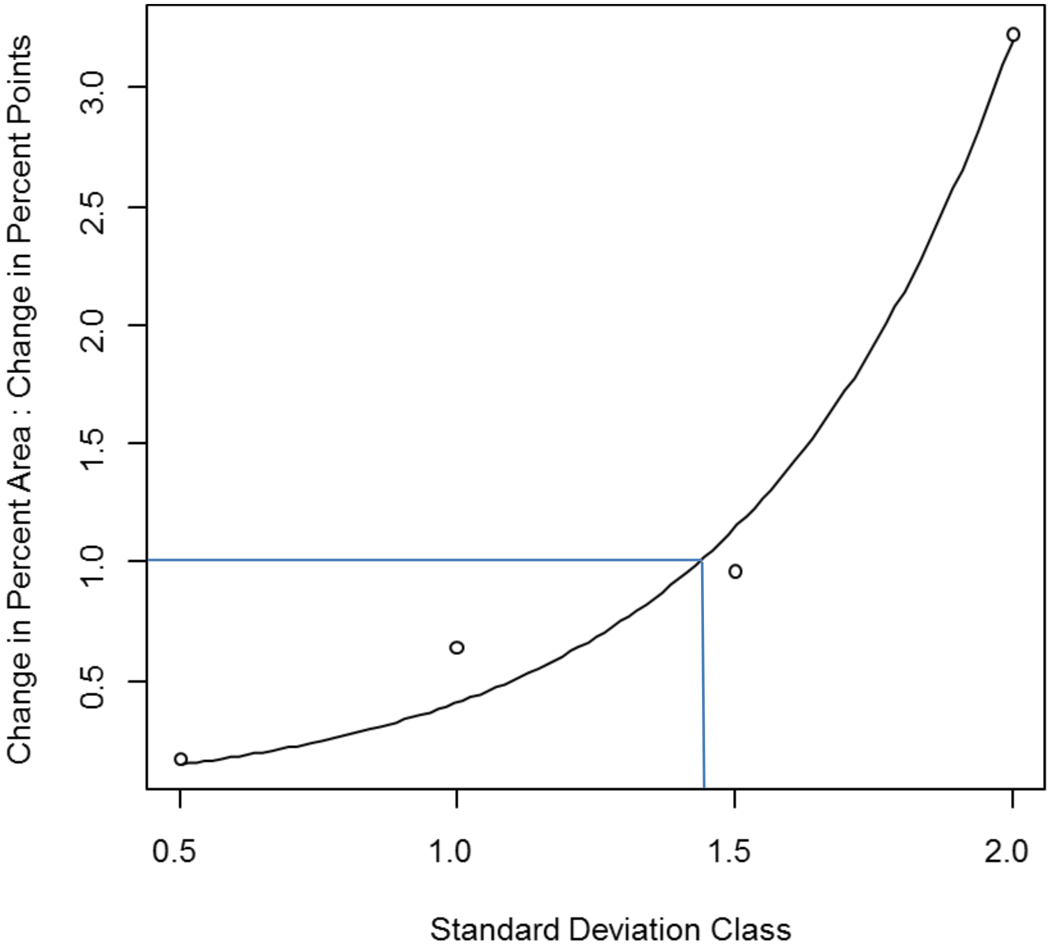

Figure 10. Relation between ratio of added potential habitat to added telemetry points validated and SD cutoff. SD, standard deviation

We used three data sets to assess the accuracy of the habitat suitability categories. The first set was comprised of locations from the 10 percent validation set within RSF regions (n = 3,124). The second set was comprised of all locations from non-RSF subregions with insufficient sample size for inclusion in the original RSF analyses (n = 609, subregions = 7). The third set was comprised of locations for active leks (see *Spatial Use Index* for data source). Locations from all validation sets were overlaid onto the categorized HSI map, and then evaluated for agreement between percentages of locations falling within each habitat category and SD percentile classes used for the habitat classification (fig. 11). In addition, Cohen's Kappa coefficient (κ) was used to assess agreement between the frequencies of observed (actual) validated HSI values versus expected values based on SD percentile bins. Cohen's Kappa is a more robust measure than a simple percentage of agreement because κ takes into account the agreement that can occur by chance alone. Values of κ greater than 0.75 constitute excellent agreement, 0.40–0.75 are acceptable, and less than 0.40 are poor (Fleiss, 1981). Relatively good agreement occurred among the validation data and habitat categories based on both percentages and κ (table 3). Agreement across all categories was exceptionally strong within the RSF subregion validation set, and acceptable for the non-RSF subregional set. On a cumulative basis, 79 percent, 94 percent, and 97 percent of leks occurred within the categories: (1) high only; (2) moderate and high; and 3) high, moderate, and low habitat, respectively. Acceptable agreement occurred for the lek validation set, but more leks occurred in high and moderate habitat than expected, and fewer leks occurred in low and non-habitat than expected.

Space Use Index

Habitat suitability categories provide a crucial piece of information to support decision-making. The second source of information that we used incorporated data regarding lek sites to estimate use of areas by sage-grouse across the landscape. We developed a composite SUI that combined the density of lek sites (breeding density) with the non-linear probability of space use relative to distance to lek (distance). Lek locations were the basis for both indices for multiple reasons. Leks are ideal locations to conduct space use analyses because they are considered hubs for nesting (Autenrich, 1985; Connelly and others, 2004) and generally are centered within seasonal use areas, meaning lek location provides an appropriate focal point for areas critical to all life phases of sage-grouse (Doherty and others, 2010a; Coates and others, 2013). Leks also are detectable using standard survey procedures and established protocols exist for counting male sage-grouse at these sites (Connelly and others, 2004), whereby males at leks were typically counted 3–4 times per season and the maximum count was recorded. Spatial coordinates for leks and associated data on sage-grouse abundance and activity were obtained from databases compiled by the NDOW and CDFW. Although 3–4 counts were typically conducted for counted leks, not all leks were counted every year across the project area. For our analyses, all included leks were classified by agency personnel as "active" (that is, leks with known male attendance) within the last 5–6 years (2009–2013) and "pending" (that is, leks with no males observed or leks that had not been surveyed adequately). Pending leks were included to allow for a more robust likelihood of sage-grouse occupancy across the landscape given the uncertainty associated with whether or not a pending lek had actually become inactive.

Table 3. Summary of habitat suitability model validation tests used to evaluate habit suitability classes for greater sage-grouse (*Centrocercus urophasianus*), Nevada and northeastern California.

[Three independent sets used for validation included: (1) radio telemetry data selected from within the subregions where RSFs (RSF subregions); (2) telemetry data outside the subregions (Non-RSF subregions); and (3) Active leks. Percent, %; Values for Cohen's kappa coefficient (κ) are in parentheses]

Habitat Suitability Classification	Expected %	Validation Sets		
		RSF subregions % (κ)	Non - RSF subregions % (κ)	Active leks % (κ)
High	69	68 (0.97)	56 (0.50)	79 (0.73)
Moderate	15	20 (0.83)	34 (0.37)	15 (0.98)
Low	9	7 (0.89)	3 (0.61)	3 (0.50)
Non-Habitat	7	5 (0.81)	7 (0.85)	3 (0.57)

To estimate density of lek sites (breeding density), we used a kernel density analysis (Silverman, 1986) and estimated the smoothing parameter (that is, bandwidth) using likelihood based cross-validation (Horne and Garton, 2006). Because substantial variation in lek size (number of attending males) existed among lek sites, individual leks were weighted by the most recent 5-year average for maximum male attendance per year. Therefore, breeding density was a function of lek distribution on the landscape (that is, proximity to each other) and lek size. Parameter estimation was conducted using Geospatial Modeling Environment (Beyer and others, 2010) and in Program R (R-Core-Team, 2012) with the 'ks' package (Duong, 2012).

The other component of the SUI consisted of adjusting for the use of space around lek sites (lek distance index), largely because leks are considered points on the landscape whereas sage-grouse use areas in relation to lek sites. Because the probability of occurrence is not likely to be a linear relationship with the Euclidean distance from a lek, we used a non-linear effect based on an average space use response curve derived by Coates and others (2013) from nearby populations of sage-grouse within the Bi-State Distinct Population Segment. Specifically, the curve was derived from quantification of the volume of population level utilization distribution (vUD) within a range of areas that varied in size and were centered on leks, up to a distance of 30 km. Utilization distributions were represented by an individual probability density function for each of 193 sage-grouse totaling nearly 11,878 sage-grouse locations. To obtain the distance index for our purposes, we simply subtracted the derived vUD value from one for every 30 m distance away from leks up to 30 km. Therefore, the lek point received a value of one, and as distance increased the value declined exponentially until it flattened at distances of 5–8 km. This calculated value provided a relative likelihood of occurrence based on previously published probability density functions from radio-telemetry data for sage-grouse. The curve developed for the Bi-State was appropriate to adopt for this analysis for multiple reasons because the curve: (1) accounted for seasonal patterns; (2) represented multiple isolated populations; (3) represented a relatively large spatial extent; and (4) likely represents other areas of the Great Basin because it consisted of substantial variation among populations as described in Coates and others (2013).

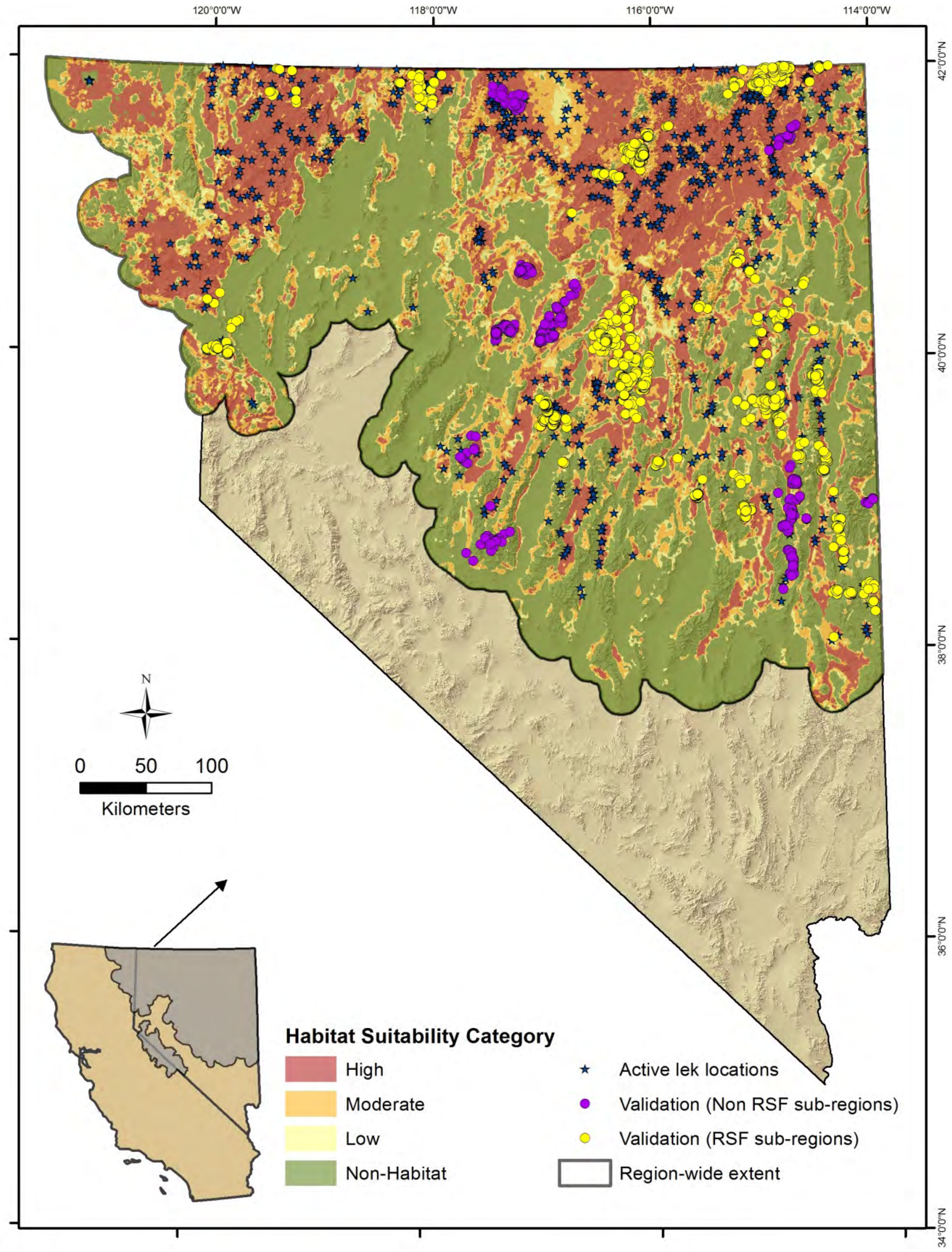

Figure 11. Map showing overlay of radio-telemetry data and lek locations used to validate habitat suitability classes for greater sage grouse (*Centrocercus urophasianus*), Nevada and northeastern California. RSF, resource selection function.

To create the SUI, grid-cell (30 x 30 m) values for lek density index and lek distance index were first normalized by dividing by the maximum of their respective index, and then averaged across all grid cells. The SUI, therefore, is a continuous, spatially explicit relative measure of sage-grouse occurrence weighted by local population size. For development of the example decision support tool, the SUI was categorized into two categories: “high use” and “low-to-no use” areas. High use areas consisted of areas that included up to 85 percent of the highest SUI density (cumulative density values). Low-to-no use areas of the landscape consisted of areas with less than 15 percent of the cumulative SUI density (fig. 12). The identification of high use regions allowed for spatial connectivity among areas of likely sage-grouse use and is consistent with previously used standards for sage-grouse breeding density (for example, Doherty and others, 2010b).

Developing a Decision-Support Tool—Combining RSF Categories with Space Use

To promote clear and effective policy decisions, it is often desirable to simplify a suite of important considerations regarding habitats or populations into a few non-overlapping classes, each of which are subject to specific rules, valuations, or interpretation for aiding in the decision-making process. The following is an example of how the intersection between habitat quality (a function of environmental attributes) and sage-grouse space use (a function of sage-grouse occurrence) can provide spatially explicit information to policymakers. Four habitat management classes were developed from the intersection of HSI and SUI categories (table 4). The rubric used to develop management classes and rationale is as follows:

1. Core Areas (fig. 13): Defined as the intersection between all suitable habitats (high, moderate, and low categories) and the high use SUI category. This habitat management class is intended to incorporate all suitable habitats that have relatively high certainty of current sage-grouse occupancy.

2. Priority Areas (fig. 13): Defined as both high suitability habitat that is present within the low-to-no use SUI category or non-suitable habitat occurring within the high use SUI category. This habitat management class encompasses: (1) high-quality habitats based on environmental covariates with a lower potential for occupancy given the current distribution of sage-grouse; and (2) sage-grouse incursion into areas of low quality habitat that is potentially important for local populations (for example, corridors of non-habitat connecting higher quality habitat).

3. General Areas (fig. 13): Defined as moderate and low habitat suitability that is present within the low-to-no use SUI category. This habitat management class represents areas with appropriate environmental conditions for sage-grouse, but are less frequently used by sage-grouse.

4. Non-habitat Areas (fig. 13): Defined as non-suitable habitat that is present within the low-to-no use SUI. This scenario represents habitat of marginal value to sage-grouse populations.

Table 4. Rubric for determining habitat management classes from habitat suitability and space use categories.

	Space Use Index Category	
Region-wide RSF Category	High Use Area	Low-to-No Use Areas
High Habitat Suitability	*Core Area*	*Priority Area*
Moderate Habitat Suitability	*Core Area*	*General Area*
Low Habitat Suitability	*Core Area*	*General Area*
Non-suitable Habitat	*Priority Area*	*Non Habitat Area*

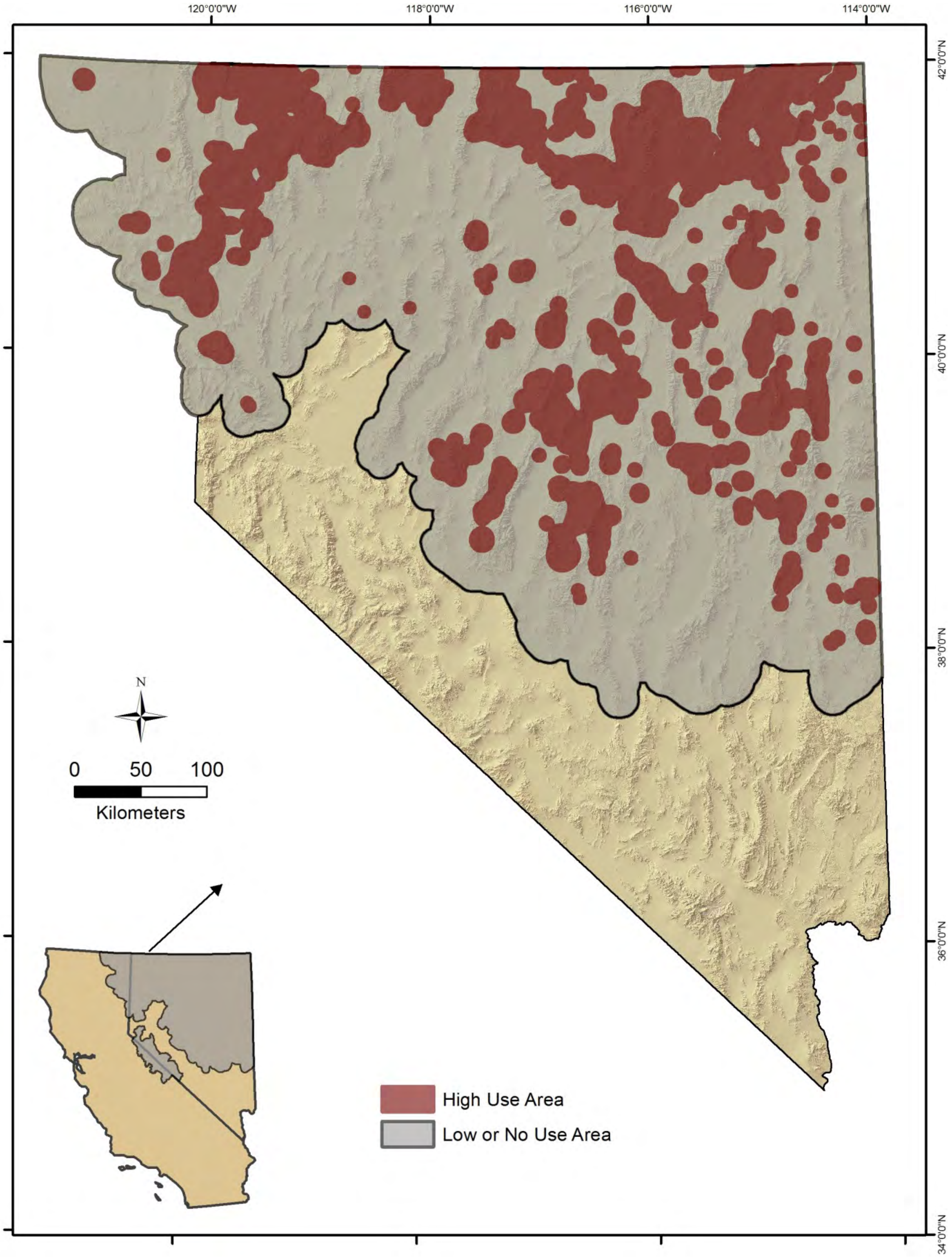

Figure 12. Map showing a space use index (SUI) that was developed compiling data on greater sage-grouse (*Centrocercus urophasianus*) use and distribution of leks, Nevada and northwestern California. Areas that contained 85 percent (%) of the total SUI density were identified as “high use” areas (reddish-brown).

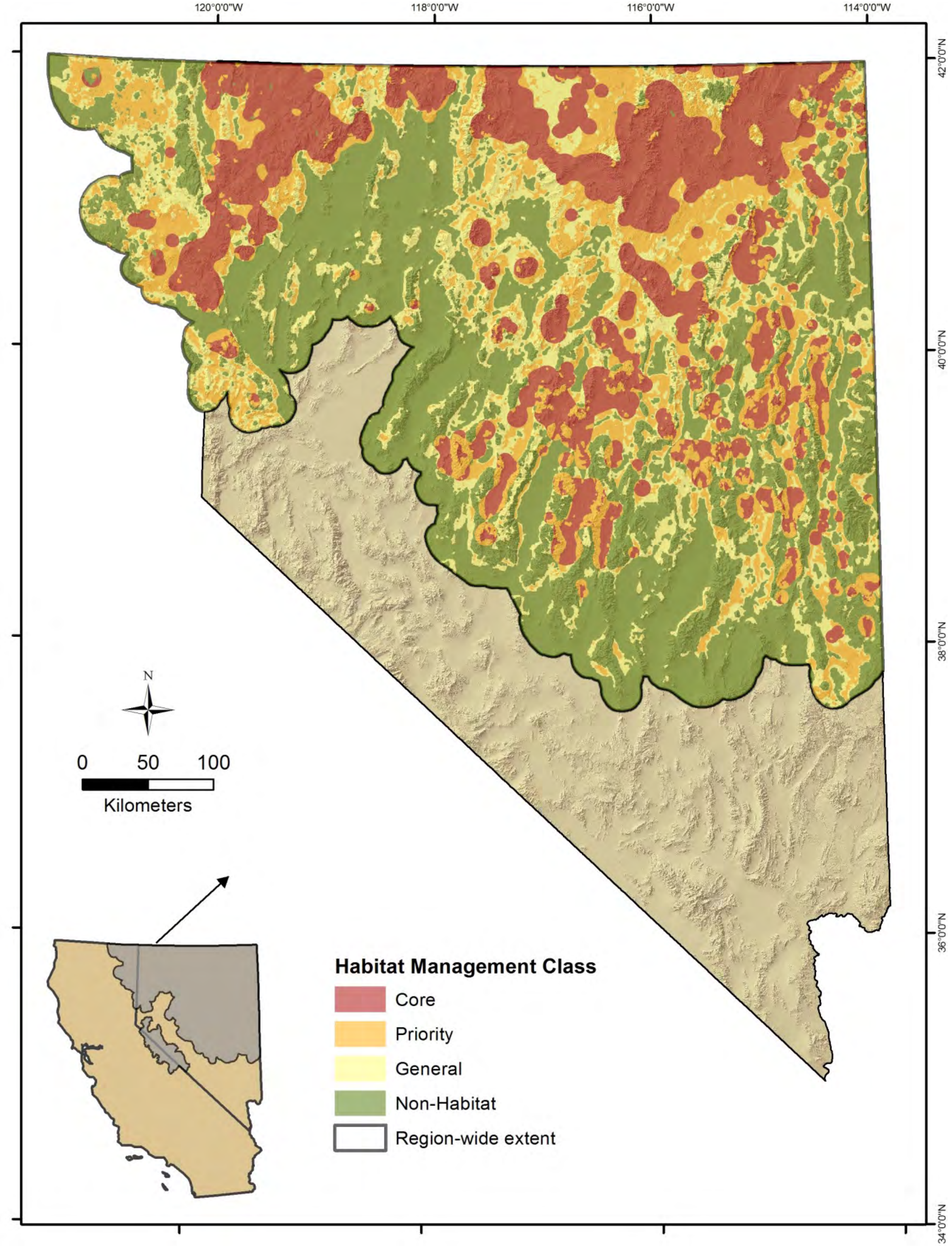

Figure 13. Map showing habitat management classes that can be determined based on the intersection of habitat suitability classes and space use index categories for greater sage grouse (*Centrocercus urophasianus*), Nevada and northeastern California.

Conclusion

This report presents a ‘first of its kind’ spatially explicit map of greater sage-grouse (*Centrocercus urophasianus*) habitat suitability across Nevada and northeastern California. Importantly, the map was informed by resource selection functions derived from data across multiple site-specific studies of sage-grouse and scaled up to a region-wide level as a habitat suitability index. The power of this approach rests within the map output that can be downscaled back to the local level that may help inform specific, “on the ground”, habitat-management decisions. However, it is important to recognize that field data and other sources of information should be used in conjunction with inferences from this model.

The example of incorporating information about space use further improves the utility of the model for conservation planning. Merging sage-grouse space use with habitat characteristics helps to identify areas with the highest likelihood of occurrence coupled with suitable habitat so that biologically significant areas can receive conservation priority. However, it must be stressed that the habitat categories and management scenarios presented serve only as examples for the types of output that can be created with this conservation planning method. Levels of habitat suitability and frequency of space use can be reclassified readily, or other space use models could be employed (that is, other home range estimators) as might be deemed appropriate through a structured decision making process among various stakeholders in sage-grouse management. In addition, either the provided or newly generated map can be updated readily as new data become available. Further estimation of variance in habitat selection associated with life history specific habitat requirements (for example, nesting, brood rearing, overwinter) and anthropogenic disturbances (for example, power lines, energy development) would be beneficial and could also be incorporated into this model framework.

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Appendix A. Supplemental Material for Buffalo-Skedaddle RSF Modeling

Table A1. Variable selection results from the "proposal set" of variables from the Buffalo-Skedaddle subregion, Nevada and northeastern California.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-34,181.4	0.0	1.0
		61.5 ha	4	-34,379.3	395.6	0.0
		Null	3	-34,400.9	436.9	0.0
		8.7 ha	4	-34,400.7	438.5	0.0
	Bare ground	61.5 ha	4	-34,387.8	0.0	1.0
		661.4 ha	4	-34,399.6	23.6	0.0
		Null	3	-34,400.9	24.1	0.0
		8.7 ha	4	-9,1626.0	114,476.3	0.0
	Cropland	661.4 ha	4	-33,830.5	0.0	1.0
		61.5 ha	4	-34,304.6	948.2	0.0
		8.7 ha	4	-34,348.4	1,035.8	0.0
		Null	3	-34,400.9	1,138.8	0.0
	Forest	661.4 ha	4	-33,470.6	0.0	1.0
		61.5 ha	4	-33,742.4	543.6	0.0
		8.7 ha	4	-33,948.6	956.1	0.0
		Null	3	-34,400.9	1,858.7	0.0
	Lowland shrub	661.4 ha	4	-34,374.1	0.0	0.93
		61.5 ha	4	-34,376.7	5.2	0.07
		8.7 ha	4	-34,388.6	28.9	0.0
		Null	3	-34,400.9	51.6	0.0
	Perennial grass	661.4 ha	4	-33,325.8	0.0	1.0
		61.5 ha	4	-34,014.7	1,377.9	0.0
		8.7 ha	4	-34,241.1	1,830.6	0.0
		Null	3	-34,400.9	2,148.3	0.0
	Pinyon-juniper	661.4 ha	4	-32,755.0	0.0	1.0
		61.5 ha	4	-32,976.5	443.1	0.0
		8.7 ha	4	-33,261.8	1,013.6	0.0
		Null	3	-34,400.9	3,289.8	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land- cover	Riparian	661.4 ha	4	-32,879.2	0.0	1.0
		61.5 ha	4	-33,578.4	1,398.5	0.0
		8.7 ha	4	-33,980.8	2,203.2	0.0
		Null	3	-34,400.9	3,041.5	0.0
	Sagebrush	8.7 ha	4	-33,784.8	0.0	0.98
		61.5 ha	4	-33,788.9	8.1	0.02
		661.4 ha	4	-34,245.8	921.9	0.0
		Null	3	-34,400.9	1,230.1	0.0
	Upland shrub	8.7 ha	4	-34,253.2	0.0	1.0
		61.5 ha	4	-34,338.3	170.2	0.0
		661.4 ha	4	-34,350.3	194.1	0.0
		Null	3	-34,400.9	293.4	0.0
	Wet meadow	8.7 ha	4	-34,193.4	0.0	0.8
		661.4 ha	4	-34,194.8	2.8	0.2
		61.5 ha	4	-34,212.9	39.1	0.0
		Null	3	-34,400.9	413.1	0.0
Agriculture	Distance to cropland	Expon. decay	4	-33,898.1	0.0	1.0
		Linear	4	-34,072.0	347.7	0.0
		Null	3	-34,400.9	1,003.6	0.0
Edge	Edge effects	661.4 ha	4	-31,631.3	0.0	1.0
		61.5 ha	4	-31,815.2	367.8	0.0
		8.7 ha	4	-32,406.5	1,550.4	0.0
		Null	3	-34,400.9	5,537.3	0.0
	Distance to edge	Expon. decay	4	-31,271.3	0.0	1.0
		Linear	4	-31,727.5	912.4	0.0
		Null	3	-34,400.9	6,257.1	0.0
Landscape variation	Variety of edge types	61.5 ha	4	-33,070.8	0.0	1.0
		8.7 ha	4	-33,230.3	318.9	0.0
		661.4 ha	4	-33,624.9	1,108.1	0.0
		Null	3	-34,400.9	2,658.1	0.0
	Variety of land cover types	61.5 ha	4	-32,507.1	0.0	1.0
		8.7 ha	4	-32,973.0	931.7	0.0
		661.4 ha	4	-33,854.0	2,693.7	0.0
		Null	3	-34,400.9	3,785.6	0.0
Water sources	Distance to spring	Linear	4	-30,963.6	0.0	1.0
	Distance to spring	Expon. decay	4	-31,349.9	772.6	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to perennial stream	Expon. decay	4	-32,313.8	2,700.3	0.0
	Distance to perennial stream	Linear	4	-32,541.7	3,156.2	0.0
Water sources	Distance to intermittent stream	Expon. decay	4	-32,549.2	3,171.2	0.0
	Distance to intermittent stream	Linear	4	-33,156.8	4,386.5	0.0
	Distance to water body	Linear	4	-33,800.3	5,673.5	0.0
	Distance to nearest stream	Expon. decay	4	-33,835.4	5,743.5	0.0
	Distance to wet meadow	Linear	4	-34,196.7	6,466.2	0.0
	Distance to water body	Expon. decay	4	-34,210.3	6,493.5	0.0
	Distance to nearest stream	Linear	4	-34,284.3	6,641.4	0.0
	Distance to wet meadow	Expon. decay	4	-34,300.4	6,673.7	0.0
	Null	Null	3	-34,400.9	6,872.6	0.0
Topographic	Roughness index	1 ha	4	-28,466.5	0.0	1.0
	Elevation	Linear	4	-33,099.8	9286.3	0.0
	Topographic position index	510 m	4	-34,399.8	11,866.7	0.0
	Null		3	-34,400.9	11,866.8	0.0
	Topographic position index	2,010 m	4	-34,456.6	11,980.2	0.0

Table A2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Buffalo-Skedaddle subregional resource selection function (RSF) model, Nevada and northeastern California.

Variable	Scale/distance function	Model averaged estimate (95-percent confidence interval)	Selection/Avoidance
Bare ground	61.5 ha	-2.89 (-3.63, -2.15)	Avoidance
Cropland	661.4 ha	1.59 (1.21, 1.97)	Selection
Forest	61.5 ha	-11.84 (-14.18, -9.51)	Avoidance
Lowland shrub	661.4 ha	-1.24 (-1.48, -1.00)	Avoidance
Perennial grass	661.4 ha	6.05 (5.30, 6.79)	Selection
Pinyon-juniper	661.4 ha	-2.47 (-2.73, -2.22)	Avoidance
Riparian	661.4 ha	-57.51 (-62.68, -52.34)	Avoidance
Sagebrush	8.7 ha	1.10 (1.03, 1.17)	Selection
Upland shrub	8.7 ha	-2.00 (-2.24, -1.75)	Avoidance
Wet meadow	8.7 ha	-11.93 (-13.69, -10.16)	Avoidance
Variety of land cover types	61.5 ha	-0.25 (-0.26, -0.24)	Avoidance
Distance to edge	Exponential decay	-1.77 (-1.85, -1.69)	Avoidance
Distance to perennial stream	Exponential decay	-1.89 (-1.99, -1.80)	Avoidance
Distance to spring	Linear	0.18 (0.17, 0.20)	Avoidance
Distance to water body	Linear	-0.07 (-0.09, -0.05)	Selection
Roughness index	1 ha	-12.68 (-13.00, -12.36)	Avoidance
Elevation	Linear	-1.53 (-1.70, -1.37)	Selection for lower elevations

Table A3. Buffalo-Skedaddle subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada and northeastern California.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Bare ground	61.5 ha	0.007	0.0003	0.004	0.0005
Cropland	661.4 ha	0.010	0.0004	0.024	0.0017
Forest	61.5 ha	0.014	0.0009	0.001	0.0002
Lowland shrub	661.4 ha	0.025	0.0009	0.020	0.0016
Perennial grass	661.4 ha	0.006	0.0002	0.017	0.0010
Pinyon-juniper	661.4 ha	0.068	0.0012	0.027	0.0021
Riparian	661.4 ha	0.003	0.0001	0.001	0.0001
Sagebrush	8.7 ha	0.823	0.0032	0.899	0.0058
Upland shrub	8.7 ha	0.015	0.0010	0.009	0.0015
Wet meadow	8.7 ha	0.007	0.0007	0.001	0.0003
Variety of land cover types	61.5 ha	3.80	0.0191	2.78	0.0371
Distance to edge	km	0.25	0.0035	0.54	0.0124
Distance to perennial stream	km	4.34	0.0003	5.88	0.0014
Distance to spring	km	2.69	0.0185	4.20	0.0468
Distance to water body	km	2.03	0.0001	1.60	0.0004
Roughness index	1 ha	0.14	0.0008	0.07	0.0014
Elevation	km	1.64	0.0001	1.57	0.0001

Appendix B. Supplemental material for Butte-Buck-White Pine RSF Modeling

Table B1. Variable selection results from the “proposal set” of variables from the Butte-Buck-White Pine subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land-cover	Annual grass	661.4 ha	4	-43,980.9	0.0	1.0
		61.5 ha	4	-44,106.0	250.1	0.0
		8.7 ha	4	-44,167.1	372.3	0.0
		Null	3	-44,236.7	509.5	0.0
	Bare ground	8.7 ha	4	-44,224.4	0.0	1.0
		61.5 ha	4	-44,234.4	20.0	0.0
		Null	3	-44,236.7	22.6	0.0
		661.4 ha	4	-44,236.2	23.7	0.0
	Cropland	661.4 ha	4	-43,256.3	0.0	1.0
		61.5 ha	4	-43,551.9	591.3	0.0
		8.7 ha	4	-43,802.2	1,091.8	0.0
		Null	3	-44,236.7	1,958.8	0.0
	Forest	8.7 ha	4	-44,185.5	0.0	1.0
		61.5 ha	4	-44,220.9	71.0	0.0
		661.4 ha	4	-44,232.5	94.1	0.0
		Null	3	-44,236.7	100.4	0.0
	Lowland shrub	61.5 ha	4	-43,475.8	0.0	1.0
		8.7 ha	4	-43,584.9	218.2	0.0
		661.4 ha	4	-43,619.9	288.1	0.0
		Null	3	-44,236.7	1,519.7	0.0
	Perennial grass	61.5 ha	4	-44,168.3	0.0	1.0
		661.4 ha	4	-44,202.2	67.7	0.0
		8.7 ha	4	-44,214.0	91.5	0.0
		Null	3	-44,236.7	134.7	0.0
	Pinyon-juniper	61.5 ha	4	-37,257.8	0.0	1.0
		8.7 ha	4	-37,911.6	1,307.6	0.0
		661.4 ha	4	-38,225.0	1,934.5	0.0
		Null	3	-44,236.7	13,955.7	0.0
	Riparian	661.4 ha	4	-44,052.0	0.0	1.0
		61.5 ha	4	-44,193.9	283.7	0.0
		8.7 ha	4	-44,235.5	366.9	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
		Null	3	-44,236.7	367.2	0.0
	Sagebrush	661.4 ha	4	-37,390.3	0.0	1.0
		61.5 ha	4	-37,804.4	828.2	0.0
		8.7 ha	4	-38,632.4	2,484.2	0.0
		Null	3	-44,236.7	13,690.6	0.0
	Upland shrub	661.4 ha	4	-44,126.9	0.0	1.0
		61.5 ha	4	-44,198.1	142.5	0.0
		8.7 ha	4	-44,224.4	195.2	0.0
		Null	3	-44,236.7	217.6	0.0
	Wet meadow	661.4 ha	4	-44,078.5	0.0	1.0
		61.5 ha	4	-44,173.1	189.2	0.0
		8.7 ha	4	-44,200.2	243.5	0.0
		Null	3	-44,236.7	314.3	0.0
Agriculture	Distance to cropland	Expon. decay	4	-41,961.8	0.0	1.0
		Linear	4	-42,223.4	523.0	0.0
		Null	3	-44,236.7	4,547.6	0.0
Edge	Edge effects	661.4 ha	4	-43,957.8	0.0	1.0
		61.5 ha	4	-44,118.4	321.2	0.0
		8.7 ha	4	-44,224.8	534.1	0.0
		Null	3	-44,236.7	555.8	0.0
	Distance to edge	Linear	4	-44,235.3	0.0	0.44
		Null	3	-44,236.7	0.8	0.29
		Expon. decay	4	-44,235.7	0.9	0.27
Landscape variation	Variety of edge types	61.5 ha	4	-44,075.0	0.0	1.0
		8.7 ha	4	-44,164.9	179.7	0.0
		661.4 ha	4	-44,231.6	313.1	0.0
		Null	3	-44,236.7	321.2	0.0
	Variety of land cover types	661.4 ha	4	-43,246.1	0.0	1.0
		61.5 ha	4	-44,174.6	1857.0	0.0
		8.7 ha	4	-44,221.9	1,951.5	0.0
		Null	3	-44,236.7	1,979.1	0.0
Water sources	Distance to intermittent stream	Linear	4	-42,153.8	0.0	1.0
	Distance to nearest stream	Linear	4	-42,219.2	130.9	0.0
	Distance to intermittent stream	Expon. decay	4	-42,781.3	1,255.0	0.0
	Distance to perennial stream	Expon. decay	4	-42,821.9	1,336.2	0.0
	Distance to nearest stream	Expon. decay	4	-42,879.6	1,451.7	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to spring	Exponential decay	4	-43,134.6	1,961.7	0.0
Water sources	Distance to perennial stream	Linear	4	-43,253.8	2,200.0	0.0
	Distance to spring	Linear	4	-43,784.2	3,260.8	0.0
	Distance to wet meadow	Linear	4	-44,144.7	3,981.8	0.0
	Distance to water body	Linear	4	-44,164.5	4,021.4	0.0
	Distance to water body	Expon. decay	4	-44,189.3	4,071.1	0.0
	Distance to wet meadow	Expon. decay	4	-44,218.7	4,129.9	0.0
	Null	Null	3	-44,236.7	4,163.7	0.0
Topographic	Roughness index	1 ha	4	-43,199.6	0.0	1.0
	Topographic position index	510 m	4	-44,159.3	1,919.3	0.0
	Elevation	Linear	4	-44,202.1	2,005.0	0.0
	Topographic position index	2010 m	4	-44,236.7	2,072.1	0.0
	Null		3	-44,243.3	2,087.3	0.0

Table B2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Butte-Buck-White Pine subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Bare ground	8.7 ha	-3.48 (-4.43, -2.54)	Avoidance
Forest	8.7 ha	-1.50 (-1.81, -1.19)	Avoidance
Lowland shrub	61.5 ha	-3.66 (-3.80, -3.51)	Avoidance
Perennial grass	61.5 ha	14.90 (13.94, 15.85)	Selection
Pinyon-juniper	61.5 ha	-4.17 (-4.26, -4.07)	Avoidance
Riparian	661.4 ha	40.74 (38.74, 42.74)	Selection
Sagebrush	661.4 ha	5.47 (5.37, 5.57)	Selection
Upland shrub	661.4 ha	8.37 (7.83, 8.91)	Selection
Edge effect	661.4 ha	11.47 (11.12, 11.82)	Selection
Variety of land cover types	661.4 ha	0.50 (0.49, 0.51)	Selection
Distance to cropland	Exponential decay	2.24 (2.17, 2.31)	Selection
Distance to intermittent stream	Linear	-2.42 (-2.50, -2.34)	Selection
Distance to spring	Exponential decay	2.84 (2.76, 2.91)	Avoidance
Distance to water body	Linear	-0.10 (-0.11, -0.10)	Selection
Distance to wet meadow	Linear	0.04 (0.03, 0.04)	Avoidance
Roughness index	1 ha	2.28 (2.04, 2.52)	Selection
Topographic position index	510 m	0.009 (0.007, 0.01)	Selected ridges / Avoided valleys
Elevation	Linear	1.57 (1.49, 1.65)	Selection for higher elevation

Table B3. Butte-Buck-White Pine subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Bare ground	8.7 ha	0.002	0.0002	0.0004	0.0002
Edge effect	661.4 ha	0.117	0.0005	0.150	0.0013
Forest	8.7 ha	0.009	0.0006	0.007	0.0006
Lowland shrub	61.5 ha	0.076	0.0018	0.036	0.0020
Perennial grass	61.5 ha	0.003	0.0002	0.009	0.0005
Pinyon-juniper	61.5 ha	0.316	0.0033	0.072	0.0036
Riparian	661.4 ha	0.010	0.0001	0.012	0.0003
Sagebrush	661.4 ha	0.558	0.0026	0.754	0.0040
Upland shrub	661.4 ha	0.009	0.0003	0.018	0.0007
Distance to cropland	Km	5.30	0.0325	3.54	0.0663
Variety of land cover types	661.4 ha	5.39	0.0147	6.65	0.0381
Distance to intermittent stream	Km	0.32	0.0033	0.17	0.1207
Distance to spring	Km	5.41	0.0327	3.18	0.0639
Distance to wet meadow	Km	10.34	0.0538	9.12	0.1207
Distance to water body	Km	4.16	0.0227	3.38	0.0438
Roughness index	1 ha	0.16	0.0008	0.13	0.0015
Topographic position index	510 m	-0.02	0.1430	1.37	0.2656
Elevation	Km	2.06	0.0018	2.13	0.0062

Appendix C. Supplemental Material for Cortez RSF Modeling

Table C1. Variable selection results from the “proposal set” of variables from the Cortez subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-77,225.4	0.0	1.0
		61.5 ha	4	-77,774.8	1,098.8	0.0
		8.7 ha	4	-77,904.0	1,357.2	0.0
		Null	3	-78,138.5	1,824.1	0.0
	Bare ground	661.4 ha	4	-75,612.3	0.0	1.0
		61.5 ha	4	-75,973.4	722.1	0.0
		8.7 ha	4	-76,322.2	1,419.7	0.0
		Null	3	-78,138.5	5,050.3	0.0
	Cropland	661.4 ha	4	-77,406.3	0.0	1.0
		61.5 ha	4	-77,572.6	332.7	0.0
		8.7 ha	4	-77,674.5	536.3	0.0
		Null	3	-78,138.5	1,462.4	0.0
	Forest	61.5 ha	4	-78,008.3	0.0	1.0
		8.7 ha	4	-78,089.1	161.6	0.0
		661.4 ha	4	-78,092.0	167.4	0.0
		Null	3	-78,138.5	258.4	0.0
	Lowland shrub	661.4 ha	4	-76,255.9	0.0	1.0
		61.5 ha	4	-76,781.9	1,052.0	0.0
		8.7 ha	4	-77,006.2	1,500.7	0.0
		Null	3	-78,138.5	3,763.2	0.0
	Perennial grass	61.5 ha	4	-78,125.2	0.0	1.0
		8.7 ha	4	-78,136.3	22.1	0.0
		Null	3	-78,138.5	24.5	0.0
		661.4 ha	4	-78,137.7	24.9	0.0
	Pinyon-juniper	61.5 ha	4	-76,096.2	0.0	1.0
		661.4 ha	4	-76,108.8	25.0	0.0
		8.7 ha	4	-76,324.8	457.1	0.0
		Null	3	-78,138.5	4,082.5	0.0
	Riparian	661.4 ha	4	-77,558.5	0.0	1.0
		61.5 ha	4	-77,626.5	136.1	0.0
		8.7 ha	4	-77,766.0	415.1	0.0
		Null	3	-78,138.5	1,158.0	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Sagebrush	661.4 ha	4	-74,476.9	0.0	1.0
		61.5 ha	4	-74,551.1	148.3	0.0
		8.7 ha	4	-74,759.7	565.5	0.0
		Null	3	-78,138.5	7,321.1	0.0
	Upland shrub	8.7 ha	4	-77,990.3	0.0	1.0
		61.5 ha	4	-78,029.8	78.9	0.0
		661.4 ha	4	-78,137.4	294.1	0.0
		Null	3	-78,138.5	294.3	0.0
	Wet meadow	661.4 ha	4	-78,057.5	0.0	1.0
		Null	3	-78,138.5	160.0	0.0
		8.7 ha	4	-78,137.7	160.3	0.0
		61.5 ha	4	-78,137.7	160.4	0.0
Agriculture	Distance to cropland	Expon. decay	4	-78,091.8	0.0	1.0
		Linear	4	-78,128.9	74.2	0.0
		Null	3	-78,138.5	91.4	0.0
Edge	Edge effects	661.4 ha	4	-77,328.9	0.0	1.0
		61.5 ha	4	-77,743.5	829.2	0.0
		8.7 ha	4	-77,918.1	1,178.5	0.0
		Null	3	-78,138.5	1,617.1	0.0
	Distance to edge	Linear	4	-77,676.7	0.0	1.0
		Expon. decay	4	-77,838.2	323.0	0.0
		Null	3	-78,138.5	921.5	0.0
Landscape variation	Variety of edge types	661.4 ha	4	-77,168.2	0.0	1.0
		61.5 ha	4	-77,887.7	1,439.0	0.0
		8.7 ha	4	-78,062.8	1,789.2	0.0
		Null	3	-78,138.5	1,938.6	0.0
	Variety of land cover types	661.4 ha	4	-77,243.7	0.0	1.0
		8.7 ha	4	-78,116.6	1,745.8	0.0
		61.5 ha	4	-78,128.4	1,769.4	0.0
		Null	3	-78,138.5	1,787.6	0.0
Water sources	Distance to perennial stream	Linear	4	-74,243.3	0.0	1.0
	Distance to perennial stream	Expon. decay	4	-74,549.4	612.2	0.0
	Distance to spring	Expon. decay	4	-75,276.4	2,066.3	0.0
	Distance to spring	Linear	4	-75,799.1	3,111.6	0.0
	Distance to nearest stream	Linear	4	-76,307.6	4,128.5	0.0
	Distance to intermittent stream	Linear	4	-76,628.3	4,770.0	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to nearest stream	Expon. decay	4	-77,301.1	6,115.6	0.0
	Distance to intermittent stream	Expon. decay	4	-77,626.9	6,767.1	0.0
	Distance to wet meadow	Expon. decay	4	-77,768.8	7,051.0	0.0
	Distance to wet meadow	Linear	4	-77,955.0	7,423.5	0.0
	Distance to water body	Linear	4	-77,985.9	7,485.2	0.0
	Distance to water body	Expon. decay	4	-78,132.4	7,778.2	0.0
	Null	Null	3	-78,138.5	7,788.4	0.0
Topography	Elevation	Linear	4	-75,718.7	0.0	1.0
	Roughness index	1 ha	4	-77,228.9	3,020.4	0.0
	Topographic position index	510 m	4	-78,136.9	4,836.3	0.0
	Null		3	-78,138.5	4,837.5	0.0
	Topographic position index	2010 m	4	-78,284.9	5,132.3	0.0

Table C2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Cortez subregional resource selection function (RSF) model, Nevada

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Bare ground	661.4 ha	-15.24 (-16.00, -14.48)	Avoidance
Cropland	661.4 ha	-6.39 (-6.83, -5.94)	Avoidance
Lowland shrub	661.4 ha	-6.27 (-6.47, -6.06)	Avoidance
Perennial grass	61.5 ha	0.71 (0.55, 0.87)	Selection
Pinyon-juniper	61.5 ha	-2.89 (-2.96, -2.82)	Avoidance
Riparian	661.4 ha	-33.51 (-34.93, -32.09)	Avoidance
Sagebrush	661.4 ha	2.35 (2.29, 2.41)	Selection
Upland shrub	8.7 ha	-6.13 (-6.89, -5.38)	Avoidance
Edge effect	661.4 ha	4.84 (4.68, 4.99)	Selection
Variety of edge types	661.4 ha	0.12 (0.116, 0.123)	Selection
Distance to perennial stream	Linear	-0.14 (-0.15, -0.14)	Selection
Distance to spring	Expon. decay	2.05 (2.01, 2.10)	Selection
Distance to water body	Linear	-0.09 (-0.10, -0.09)	Selection
Distance to wet meadow	Linear	-2.19 (-2.27, -2.11)	Selection
Roughness index	1 ha	3.76 (3.63, 3.90)	Selection
Elevation	Linear	3.26 (3.19, 3.33)	Selection for higher elevations

Table C3. Cortez subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Bare ground	661.4 ha	0.048	0.0012	0.003	0.0003
Cropland	661.4 ha	0.020	0.0006	0.004	0.0003
Lowland shrub	661.4 ha	0.050	0.0007	0.015	0.0007
Perennial grass	61.5 ha	0.020	0.0005	0.015	0.0009
Pinyon-juniper	61.5 ha	0.135	0.0018	0.034	0.0018
Riparian	661.4 ha	0.006	0.0001	0.004	0.0001
Sagebrush	661.4 ha	0.686	0.0019	0.855	0.0025
Upland shrub	8.7 ha	0.003	0.0003	0.0006	0.0001
Edge effect	661.4 ha	0.116	0.0006	0.127	0.0013
Variety of edge types	661.4 ha	6.98	0.0285	7.45	0.0607
Distance to perennial stream	Km	7.43	0.0309	5.55	0.0602
Distance to spring	Km	3.07	0.0150	2.50	0.0294
Distance to water body	Km	4.97	0.0208	5.09	0.0374
Distance to wet meadow	Km	9.56	0.0290	10.03	0.0558
Roughness	1 ha	0.14	0.0007	0.16	0.0011
Elevation	Km	1.92	0.0013	1.99	0.0032

Appendix D. Supplemental Material for Desert-Tuscarora RSF Modeling

Table D1. Variable selection results from the “proposal set” of variables from the Desert-Tuscarora subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land-cover	Annual grass	661.4 ha	4	-52,893.7	0.0	1.0
		61.5 ha	4	-54,780.3	3,773.1	0.0
		8.7 ha	4	-55,275.5	4,763.6	0.0
		Null	3	-56,394.5	6,999.5	0.0
	Bare ground	661.4 ha	4	-56,239.7	0.0	1.0
		61.5 ha	4	-56,353.4	227.4	0.0
		8.7 ha	4	-56,385.8	292.2	0.0
		Null	3	-56,394.5	307.5	0.0
	Cropland	661.4 ha	4	-55,243.5	0.0	1.0
		61.5 ha	4	-55,675.4	863.9	0.0
		8.7 ha	4	-55,832.3	1,177.5	0.0
		Null	3	-56,394.5	2,299.9	0.0
	Forest	61.5 ha	4	-55,515.5	0.0	1.0
		661.4 ha	4	-55,542.9	54.8	0.0
		8.7 ha	4	-55,597.7	164.3	0.0
		Null	3	-56,394.5	1,755.9	0.0
	Lowland shrub	661.4 ha	4	-56,172.6	0.0	1.0
		61.5 ha	4	-56,273.9	202.6	0.0
		8.7 ha	4	-56,308.7	272.3	0.0
		Null	3	-56,394.5	441.8	0.0
	Perennial grass	661.4 ha	4	-56,115.9	0.0	1.0
		61.5 ha	4	-56,245.4	258.9	0.0
		8.7 ha	4	-56,324.8	417.8	0.0
		Null	3	-56,394.5	555.1	0.0
	Pinyon-juniper	61.5 ha	4	-55,831.4	0.0	1.0
		661.4 ha	4	-55,880.9	99.0	0.0
		8.7 ha	4	-55,968.8	274.8	0.0
		Null	3	-56,394.5	1,124.1	0.0
	Riparian	661.4 ha	4	-56,344.3	0.0	1.0
		61.5 ha	4	-56,362.0	35.2	0.0
		8.7 ha	4	-56,384.9	81.1	0.0
		Null	3	-56,394.5	98.2	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Sagebrush	8.7 ha	4	-56,373.7	0.0	0.9986
		61.5 ha	4	-56,380.3	13.2	0.0014
		661.4 ha	4	-56,392.9	38.5	0.0
		Null	3	-56,394.5	39.6	0.0
	Upland shrub	661.4 ha	4	-56,242.2	0.0	1.0
		61.5 ha	4	-56,383.6	282.7	0.0
		Null	3	-56,394.5	302.5	0.0
		8.7 ha	4	-1,466,256	2,820,027.0	0.0
	Wet meadow	661.4 ha	4	-56,280.8	0.0	1.0
		8.7 ha	4	-56,390.7	219.7	0.0
		61.5 ha	4	-56,391.7	221.7	0.0
		Null	3	-56,394.5	225.3	0.0
Agriculture	Distance to cropland	Linear	4	-54,776.6	0.0	1.0
		Expon. Decay	4	-54,809.9	66.5	0.0
		Null	3	-56,394.5	3,233.7	0.0
Edge	Edge effects	61.5 ha	4	-56,239.3	0.0	1.0
		8.7 ha	4	-56,273.1	67.5	0.0
		661.4 ha	4	-56,300.9	123.1	0.0
		Null	3	-56,394.5	308.2	0.0
	Distance to edge	Linear	4	-56,201.2	0.0	1.0
		Expon. Decay	4	-56,393.3	384.2	0.0
		Null	3	-56,394.5	384.6	0.0
Landscape variation	Variety of edge types	61.5 ha	4	-56,274.4	0.0	1.0
		8.7 ha	4	-56,307.5	66.2	0.0
		661.4 ha	4	-56,376.0	203.2	0.0
		Null	3	-56,394.5	238.0	0.0
	Variety of land cover types	61.5 ha	4	-56,339.6	0.0	1.0
		661.4 ha	4	-56,365.3	51.4	0.0
		8.7 ha	4	-56,370.0	60.8	0.0
		Null	3	-56,394.5	107.8	0.0
Water sources	Distance to wet meadow	Linear	4	-48,894.1	0.0	1.0
	Distance to nearest stream	Linear	4	-53,448.4	9,108.5	0.0
	Distance to wet meadow	Expon. Decay	4	-53,712.7	9,637.2	0.0
	Distance to nearest stream	Expon. Decay	4	-54,668.6	11,548.9	0.0
	Distance to intermittent stream	Expon. Decay	4	-55,166.7	12,545.2	0.0
	Distance to intermittent stream	Linear	4	-55,269.2	12,750.2	0.0
	Distance to spring	Linear	4	-55,453.6	13,118.9	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Water sources	Distance to water body	Expon. Decay	4	-55,500.6	13,213.0	0.0
	Distance to perennial Stream	Expon. Decay	4	-55,548.7	13,309.1	0.0
	Distance to spring	Expon. Decay	4	-56,185.9	14,583.5	0.0
	Distance to perennial stream	Linear	4	-56,315.5	14,842.7	0.0
	Distance to water body	Linear	4	-56,353.2	14,918.3	0.0
	Null	Null	3	-56,394.5	14,998.7	0.0
Topography	Roughness index	1 ha	4	-53,854.4	0.0	1.0
	Elevation	Linear	4	-56,043.5	4,378.1	0.0
	Topographic position index	510 m	4	-56,190.2	4,671.6	0.0
	Null		3	-56,394.5	5,078.1	0.0
	Topographic position index	2010 m	4	-56,429.1	5,149.3	0.0

Table D2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Desert-Tuscarora subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Annual grass	661.4 ha	-42.68 (-44.82, -40.55)	Avoidance
Bare ground	661.4 ha	-40.89 (-46.19, -35.58)	Avoidance
Forest	61.5 ha	-10.67 (-11.30, -10.03)	Avoidance
Lowland shrub	661.4 ha	-3.21 (-4.21, -2.20)	Avoidance
Perennial grass	661.4 ha	-6.51 (-7.10, -5.92)	Avoidance
Pinyon-juniper	61.5 ha	-6.24 (-6.61, -5.86)	Avoidance
Riparian	661.4 ha	-3.34 (-3.83, -2.86)	Avoidance
Sagebrush	8.7 ha	0.65 (0.60, 0.70)	Selection
Upland shrub	661.4 ha	-18.16 (-19.99, -16.33)	Avoidance
Variety of edge types	61.5 ha	-0.09 (-0.09, -0.08)	Avoidance
Distance to cropland	Linear	-0.17 (-0.18, -0.16)	Selection
Distance to edge	Linear	-0.74 (-0.84, -0.64)	Selection
Distance to nearest stream	Linear	2.69 (2.61, 2.77)	Avoidance
Distance to spring	Linear	-0.10 (-0.11, -0.09)	Selection
Distance to water body	Expon. Decay	-2.56 (-2.64, -2.48)	Selection
Distance to wet meadow	Linear	-0.13 (-0.14, -0.13)	Selection
Roughness index	1 ha	-5.49 (-5.69, -5.29)	Avoidance
Topographic position index	510 m	0.009 (0.009, 0.01)	Selected ridges / Avoided valleys
Elevation	Linear	-2.24 (-2.33, -2.14)	Selection for Lower Elevations

Table D3. Desert-Tuscarora subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Annual grass	661.4 ha	0.014	0.0003	0.004	0.0001
Bare ground	661.4 ha	0.002	0.0001	0.0008	0.0000
Forest	61.5 ha	0.015	0.0005	0.003	0.0003
Lowland shrub	661.4 ha	0.004	0.0002	0.0004	0.0002
Perennial grass	661.4 ha	0.027	0.0002	0.026	0.0004
Pinyon-juniper	61.5 ha	0.022	0.0004	0.013	0.0005
Riparian	661.4 ha	0.023	0.0003	0.027	0.0005
Upland shrub	661.4 ha	0.003	0.0001	0.001	0.0001
Sagebrush	8.7 ha	0.854	0.0019	0.845	0.0050
Distance to cropland	Km	2.30	0.0129	1.78	0.0279
Variety of edge types	61.5 ha	3.83	0.0197	3.63	0.0427
Distance to edge	Km	0.14	0.0013	0.14	0.0022
Distance to nearest stream	Km	0.20	0.0012	0.30	0.0038
Distance to spring	Km	2.00	0.0130	1.72	0.0169
Distance to water body	Km	3.23	0.0168	3.36	0.0266
Distance to wet meadow	Km	13.22	0.0654	6.96	0.0614
Roughness index	1 ha	0.20	0.0006	0.16	0.0012
Topographic position index	510 m	-0.07	0.1459	2.69	0.2543
Elevation	Km	1.93	0.0015	1.90	0.0022

Appendix E. Supplemental Material for Gollaher-O'Neil RSF Modeling

Table E1. Variable selection results from the "proposal set" of variables from the Gollaher-O'Neil subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-40,679.6	0.0	1.0
		61.5 ha	4	-40,836.8	314.4	0.0
		8.7 ha	4	-40,845.8	332.4	0.0
		Null	3	-40,861.0	360.9	0.0
	Bare ground	661.4 ha	4	-40,238.0	0.0	1.0
		61.5 ha	4	-40,756.0	1,035.9	0.0
		8.7 ha	4	-40,832.0	1,187.9	0.0
		Null	3	-40,861.0	1,244.0	0.0
	Cropland	661.4 ha	4	-39,985.7	0.0	1.0
		61.5 ha	4	-40,535.5	1,099.6	0.0
		8.7 ha	4	-40,635.0	1,298.6	0.0
		Null	3	-40,861.0	1,748.7	0.0
	Forest	661.4 ha	4	-39,276.3	0.0	1.0
		61.5 ha	4	-39,770.1	987.6	0.0
		8.7 ha	4	-40,176.3	1,800.0	0.0
		Null	3	-40,861.0	3,167.5	0.0
	Lowland shrub	661.4 ha	4	-39,179.8	0.0	1.0
		61.5 ha	4	-39,803.7	1,247.8	0.0
		8.7 ha	4	-40,216.0	2,072.4	0.0
		Null	3	-40,861.0	3,360.4	0.0
	Perennial grass	661.4 ha	4	-40,102.6	0.0	1.0
		8.7 ha	4	-40,573.1	941.1	0.0
		61.5 ha	4	-40,611.8	1,018.4	0.0
		Null	3	-40,861.0	1,514.9	0.0
	Pinyon-juniper	661.4 ha	4	-39,837.9	0.0	1.0
		61.5 ha	4	-40,733.0	1,790.2	0.0
		8.7 ha	4	-40,825.3	1,974.8	0.0
		Null	3	-40,861.0	2,044.3	0.0
	Riparian	661.4 ha	4	-39,795.3	0.0	1.0
		61.5 ha	4	-39,817.2	43.7	0.0
		8.7 ha	4	-40,116.6	642.5	0.0
		Null	3	-40,861.0	2,129.4	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Sagebrush	661.4 ha	4	-39,375.7	0.0	1.0
		61.5 ha	4	-39,429.8	108.1	0.0
		8.7 ha	4	-39,809.8	868.0	0.0
		Null	3	-40,861.0	2,968.6	0.0
	Upland shrub	661.4 ha	4	-40,728.1	0.0	1.0
		61.5 ha	4	-40,784.0	111.9	0.0
		8.7 ha	4	-40,829.4	202.7	0.0
		Null	3	-40,861.0	263.9	0.0
Agriculture	Distance to cropland	Linear	4	-38,573.2	0.0	1.0
		Expon. decay	4	-40,091.9	3,037.4	0.0
		Null	3	-40,861.0	4,573.7	0.0
Edge	Edge effects	61.5 ha	4	-39,709.7	0.0	1.0
		661.4 ha	4	-39,792.5	165.6	0.0
		8.7 ha	4	-40,109.4	799.4	0.0
		Null	3	-40,861.0	2,300.6	0.0
	Distance to edge	Expon. decay	4	-39,801.5	0.0	1.0
		Linear	4	-40,179.1	755.1	0.0
		Null	3	-40,861.0	2,117.0	0.0
Landscape variation	Variety of edge types	661.4 ha	4	-39,413.5	0.0	1.0
		61.5 ha	4	-39,572.8	318.6	0.0
		8.7 ha	4	-39,738.0	649.0	0.0
		Null	3	-40,861.0	2,893.1	0.0
	Variety of land cover types	8.7 ha	4	-39,554.7	0.0	1.0
		61.5 ha	4	-39,741.3	373.3	0.0
		661.4 ha	4	-40,614.3	2,119.2	0.0
		Null	3	-40,861.0	2,610.7	0.0
Water source	Distance to intermittent stream	Linear	4	-37,343.6	0.0	1.0
	Distance to intermittent stream	Expon. decay	4	-37,854.2	1,021.3	0.0
	Distance to wet meadow	Linear	4	-38,690.8	2,694.4	0.0
	Distance to nearest stream	Linear	4	-38,705.3	2,723.4	0.0
	Distance to nearest stream	Expon. decay	4	-39,289.1	3,891.0	0.0
	Distance to wet meadow	Expon. decay	4	-39,427.8	4,168.4	0.0
	Distance to spring	Expon. decay	4	-40,084.8	5,482.5	0.0
	Distance to water body	Linear	4	-40,368.7	6,050.2	0.0
	Distance to spring	Linear	4	-40,501.4	6,315.6	0.0
	Distance to water body	Expon. decay	4	-40,638.4	6,589.6	0.0

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to perennial stream	Linear	4	-40,758.3	6,829.3	0.0
	Null	Null	3	-40,861.0	7,032.9	0.0
	Distance to perennial stream	Expon. decay	4	-40,861.0	7,034.9	0.0
Topography	Elevation	Linear	4	-39,028.3	0.0	1.0
	Roughness Index	1 ha	4	-39,744.7	1,432.8	0.0
	Topographic position index	2010 m	4	-40,600.8	3,144.9	0.0
	Topographic position index	510 m	3	-40,803.9	3,551.3	0.0
	Null		4	-40,861.0	3,663.5	0.0

Table E2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Gollaher-O'Neil subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Forest	661.4 ha	-19.56 (-20.62, -18.49)	Avoidance
Riparian	661.4 ha	-21.72 (-22.55, -20.89)	Avoidance
Sagebrush	661.4 ha	9.09 (8.75, 9.42)	Selection
Upland shrub	661.4 ha	-12.09 (-13.62, -10.57)	Avoidance
Edge effects	61.5 ha	-4.59 (-4.78, -4.39)	Avoidance
Variety of edge types	661.4 ha	-0.21 (-0.21, -0.20)	Avoidance
Distance to cropland	Linear	-0.34 (-0.35, -0.33)	Selection
Distance to intermittent stream	Linear	2.81 (2.74, 2.88)	Avoidance
Distance to spring	Exponential decay	-1.06 (-1.15, -0.98)	Avoidance
Distance to water body	Linear	-0.12 (-0.14, -0.11)	Selection
Roughness index	1 ha	-5.66 (-5.90, -5.43)	Avoidance
Topographic position index	2010 m	0.005 (0.004, 0.005)	Selected ridges / Avoided valleys
Elevation	Linear	-1.99 (-2.08, -1.90)	Selection for Lower Elevations

Table E3. Gollaher-O'Neil subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Forest	661.4 ha	0.023	0.0007	0.003	0.0003
Riparian	661.4 ha	0.026	0.0004	0.012	0.0004
Sagebrush	661.4 ha	0.890	0.0012	0.933	0.0010
Upland shrub	661.4 ha	0.005	0.0001	0.004	0.0003
Edge effects	61.5 ha	0.12	0.0010	0.08	0.0018
Variety of edge types	661.4 ha	5.96	0.0287	4.77	0.0490
Distance to cropland	Km	2.49	0.0188	1.58	0.0202
Distance to intermittent stream	Km	0.25	0.0023	0.39	0.0078
Distance to spring	Km	2.49	0.0163	2.62	0.0336
Distance to water body	Km	2.07	0.0127	1.95	0.0212
Roughness index	1 ha	0.18	0.0008	0.16	0.0015
Topographic position index	2010 m	-0.27	0.3952	6.17	0.6330
Elevation	Km	1.94	0.0023	1.84	0.0037

Appendix F. Supplemental Material for Lincoln-Schell-Snake RSF Modeling

Table F1. Variable selection results from the “proposal set” of variables from the Lincoln-Schell-Snake subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-13,552.1	0.0	1.0
		61.5 ha	4	-13,568.1	31.9	0.0
		8.7 ha	4	-13,581.8	59.4	0.0
		Null	3	-13,606.5	106.7	0.0
	Bare ground	661.4 ha	4	-13,171.4	0.0	1.0
		61.5 ha	4	-13,244.4	146.0	0.0
		8.7 ha	4	-13,383.1	423.4	0.0
		Null	3	-13,606.5	868.2	0.0
	Cropland	661.4 ha	4	-11,792.0	0.0	1.0
		61.5 ha	4	-12,162.7	741.4	0.0
		8.7 ha	4	-12,383.0	1,181.9	0.0
		Null	3	-13,606.5	3,626.9	0.0
	Forest	661.4 ha	4	-12,920.6	0.0	1.0
		61.5 ha	4	-13,036.1	231.0	0.0
		8.7 ha	4	-13,135.5	429.9	0.0
		Null	3	-13,606.5	1,369.8	0.0
	Lowland shrub	8.7 ha	4	-13,544.2	0.0	1.0
		61.5 ha	4	-13,554.5	20.7	0.0
		Null	3	-13,606.5	122.6	0.0
		661.4 ha	4	-13,606.4	124.5	0.0
	Perennial grass	661.4 ha	4	-12,535.4	0.0	1.0
		61.5 ha	4	-12,692.8	314.8	0.0
		8.7 ha	4	-13,009.3	947.7	0.0
		Null	3	-13,606.5	2,140.1	0.0
	Pinyon-juniper	61.5 ha	4	-11,412.7	0.0	1.0
		8.7 ha	4	-11,520.4	215.5	0.0
		661.4 ha	4	-11,559.2	293.0	0.0
		Null	3	-13,606.5	4385.5	0.0
	Riparian	661.4 ha	4	-13,262.4	0.0	1.0
		8.7 ha	4	-13,372.6	220.5	0.0
		61.5 ha	4	-13,389.6	254.4	0.0
		Null	3	-13,606.5	686.1	0.0

Group	Variable	Scale/distance function	K	Log Likelihood	ΔAICc	Model Weight
	Sagebrush	661.4 ha	4	-12,227.2	0.0	1.0
		61.5 ha	4	-12,597.8	741.2	0.0
		8.7 ha	4	-12,703.4	952.4	0.0
		Null	3	-13,606.5	2,756.5	0.0
	Upland shrub	61.5 ha	4	-13,545.1	0.0	1.0
		8.7 ha	4	-13,561.6	33.0	0.0
		661.4 ha	4	-13,573.6	57.1	0.0
		Null	3	-13,606.5	120.8	0.0
	Wet Meadow	661.4 ha	4	-12,561.4	0.0	1.0
		61.5 ha	4	-13,063.7	1,004.5	0.0
		8.7 ha	4	-13,385.3	1,647.8	0.0
		Null	3	-13,606.5	2,088.2	0.0
Agriculture	Distance to cropland	Expon. decay	4	-11,806.1	0.0	0.98
		Linear	4	-11,810.3	8.3	0.02
		Null	3	-13,606.5	3,598.7	0.0
Edge	Edge effects	661.4 ha	4	-13,348.6	0.0	1.0
		61.5 ha	4	-13,575.3	453.4	0.0
		8.7 ha	4	-13,603.1	509.0	0.0
		Null	3	-13,606.5	513.8	0.0
	Distance to edge	Expon. decay	4	-13,574.8	0.0	0.64
		Linear	4	-13,575.3	1.1	0.36
		Null	3	-13,606.5	61.5	0.0
Landscape variation	Variety of edge types	661.4 ha	4	-13,013.2	0.0	1.0
		61.5 ha	4	-13,371.7	717.1	0.0
		8.7 ha	4	-13,563.4	1,100.4	0.0
		Null	3	-13,606.5	1,184.6	0.0
	Variety of land cover types	661.4 ha	4	-12,769.2	0.0	1.0
		61.5 ha	4	-13,455.1	1,371.8	0.0
		8.7 ha	4	-13,571.8	1,605.2	0.0
		Null	3	-13,606.5	1,672.5	0.0
Water source	Distance to water body	Linear	4	-11,831.9	0.0	1.0
	Distance to water body	Expon. decay	4	-11,945.6	2,27.3	0.0
	Distance to wet meadow	Expon. decay	4	-12,845.2	2,026.5	0.0
	Distance to wet meadow	Linear	4	-13,198.9	2,733.8	0.0
	Distance to perennial stream	Linear	4	-13,441.2	3,218.4	0.0
	Distance to spring	Linear	4	-13,473.8	3,283.7	0.0
	Distance to intermittent stream	Expon. decay	4	-13,546.7	3,429.5	0.0

Group	Variable	Scale/distance function	K	Log Likelihood	ΔAICc	Model Weight
	Distance to Spring	Expon. decay	4	-13,547.5	3,431.0	0.0
	Distance to Perennial Stream	Expon. decay	4	-13,552.0	3,440.1	0.0
	Distance to Nearest Stream	Expon. decay	4	-13,585.8	3,507.8	0.0
	Distance to Nearest Stream	Linear	4	-13,603.9	3,543.9	0.0
	Null	Null	3	-13,606.5	3,547.1	0.0
	Distance to Intermittent Stream	Linear	4	-13,606.3	3,548.7	0.0
Topography	Roughness Index	1 ha	4	-12,298.3	0.0	1.0
	Elevation	Linear	4	-13,001.8	1,380.5	0.0
	Topographic Position Index	510 m	4	-13,590.3	2,583.9	0.0
	Null		3	-13,606.5	2,614.4	0.0
	Topographic Position Index	2010 m	4	-13,635.4	2,674.3	0.0

Table F2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Lincoln-Schell-Snake subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Cropland	661.4 ha	21.42 (20.58, 22.26)	Selection
Forest	661.4 ha	-5.96 (-6.35, -5.56)	Avoidance
Lowland shrub	8.7 ha	-1.35 (-1.45, -1.25)	Avoidance
Perennial grass	661.4 ha	37.62 (35.99, 39.26)	Selection
Pinyon-juniper	61.5 ha	-3.79 (-3.97, -3.61)	Avoidance
Riparian	661.4 ha	-8.25 (-9.72, -6.78)	Avoidance
Sagebrush	661.4 ha	4.68 (4.53, 4.84)	Selection
Upland shrub	61.5 ha	-4.27 (-5.01, -3.52)	Avoidance
Edge effects	661.4 ha	12.58 (11.97, 13.18)	Selection
Variety of land cover types	661.4 ha	0.47 (0.45, 0.49)	Selection
Distance to perennial stream	Linear	-0.12 (-0.13, -0.11)	Selection
Distance to spring	Linear	-0.17 (-0.18, -0.16)	Selection
Distance to water body	Linear	-0.57 (-0.59, -0.55)	Selection
Distance to wet meadow	Exponential decay	3.41 (3.28, 3.54)	Selection
Roughness index	1 ha	-10.87 (-11.28, -10.45)	Avoidance
Topographic position index	510 m	0.005 (0.003, 0.007)	Selected ridges / Avoided valleys
Elevation	Linear	-1.21 (-1.31, -1.11)	Selection for Higher Elevations

Table F3. Lincoln-Schell-Snake subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Cropland	661.4 ha	0.008	0.0005	0.115	0.0045
Forest	661.4 ha	0.081	0.0026	0.012	0.0016
Lowland shrub	8.7 ha	0.138	0.0049	0.115	0.0083
Perennial grass	661.4 ha	0.005	0.0003	0.047	0.0026
Pinyon-juniper	61.5 ha	0.314	0.0059	0.033	0.0044
Riparian	661.4 ha	0.017	0.0004	0.011	0.0007
Sagebrush	661.4 ha	0.405	0.0045	0.563	0.0093
Upland shrub	61.5 ha	0.013	0.0010	0.005	0.0011
Edge effects	661.4 ha	0.11	0.0009	0.15	0.0022
Variety of land cover types	661.4 ha	5.39	0.0289	7.39	0.0810
Distance to perennial stream	Km	4.62	0.0512	3.58	0.0814
Distance to spring	Km	3.43	0.0404	2.51	0.0624
Distance to water body	Km	4.03	0.0353	1.75	0.0555
Distance to wet meadow	Km	11.90	0.1191	7.38	0.2442
Roughness index	1 ha	0.18	0.0016	0.10	0.0021
Topographic position index	510 m	-0.53	0.3133	0.70	0.3097
Elevation	Km	2.11	0.0053	1.94	0.0088

Appendix G. Supplemental Material for Lone Willow RSF Modeling

Table G1. Variable selection results from the “proposal set” of variables from the Lone Willow subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-3,066.1	0.0	1.00
		61.5 ha	4	-3,113.8	95.4	0.00
		8.7 ha	4	-3,131.2	130.2	0.00
		Null	3	-3,188.5	242.8	0.00
	Bare ground	61.5 ha	4	-3,170.1	0.0	0.90
		661.4 ha	4	-3,172.2	4.3	0.10
		8.7 ha	4	-3,180.1	20.1	0.00
		Null	3	-3,188.5	34.8	0.00
	Cropland	661.4 ha	4	-3,116.0	0.0	1.00
		61.5 ha	4	-3,129.4	26.9	0.00
		8.7 ha	4	-3,131.7	31.5	0.00
		Null	3	-3,188.5	143.0	0.00
	Forest	8.7 ha	4	-3,174.2	0.0	0.56
		661.4 ha	4	-3,174.7	1.0	0.34
		61.5 ha	4	-3,176.0	3.5	0.10
		Null	3	-3,188.5	26.6	0.00
	Lowland shrub	661.4 ha	4	-3,120.4	0.0	1.00
		61.5 ha	4	-3,157.8	74.9	0.00
		8.7 ha	4	-3,161.9	83.0	0.00
		Null	3	-3,188.5	134.2	0.00
	Perennial grass	661.4 ha	4	-3,121.1	0.0	1.00
		61.5 ha	4	-3,158.4	74.6	0.00
		8.7 ha	4	-3,177.5	112.8	0.00
		Null	3	-3,188.5	132.7	0.00
	Pinyon-juniper	661.4 ha	4	-3,146.9	0.0	1.00
		61.5 ha	4	-3,180.9	67.9	0.00
		Null	3	-3,188.5	81.1	0.00
		8.7 ha	4	-3,188.5	83.1	0.00
	Riparian	61.5 ha	4	-3,186.1	0.0	0.47
		8.7 ha	4	-3,186.4	0.5	0.37
		Null	3	-3,188.5	2.7	0.12
		661.4 ha	4	-3,188.5	4.7	0.04

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Sagebrush	661.4 ha	4	-3,149.4	0.0	1.00
		8.7 ha	4	-3,158.4	18.0	0.00
		61.5 ha	4	-3,167.6	36.3	0.00
		Null	3	-3,188.5	76.1	0.00
	Upland shrub	661.4 ha	4	-3,097.0	0.0	1.00
		61.5 ha	4	-3,130.7	67.4	0.00
		8.7 ha	4	-3,154.4	114.9	0.00
		Null	3	-3,188.5	180.9	0.00
	Wet meadow	661.4 ha	4	-3,129.0	0.0	1.00
		61.5 ha	4	-3,168.9	79.9	0.00
		8.7 ha	4	-3,184.0	110.0	0.00
		Null	3	-3,188.5	117.0	0.00
Agriculture	Distance to cropland	Linear	4	-3,184.2	0.0	0.91
		Expon. decay	4	-3,187.0	5.7	0.05
		Null	3	-3,188.5	6.6	0.03
Edge	Edge effects	661.4 ha	4	-2,930.4	0.0	1.00
		61.5 ha	4	-3,062.3	263.7	0.00
		8.7 ha	4	-3,114.0	367.1	0.00
		Null	3	-3,188.5	514.1	0.00
	Distance to edge	Expon. decay	4	-3,129.3	0.0	0.63
		Linear	4	-3,129.8	1.1	0.37
		Null	3	-3,188.5	116.3	0.00
Landscape variation	Variety of edge types	661.4 ha	4	-3,034.4	0.0	1.00
		61.5 ha	4	-3,090.4	112.0	0.00
		8.7 ha	4	-3,101.5	134.3	0.00
		Null	3	-3,188.5	306.2	0.00
	Variety of land cover types	661.4 ha	4	-3,049.3	0.0	1.00
		8.7 ha	4	-3,115.6	132.6	0.00
		61.5 ha	4	-3,134.2	169.7	0.00
		Null	3	-3,188.5	276.3	0.00
Water source	Distance to wet meadow	Linear	4	-3,002.3	0.0	1.00
	Distance to spring	Linear	4	-3,014.1	23.7	0.00
	Distance to spring	Expon. decay	4	-3,024.5	44.4	0.00
	Distance to wet meadow	Expon. decay	4	-3,046.5	88.5	0.00
	Distance to water body	Linear	4	-3,076.2	147.9	0.00
	Distance to water body	Expon. decay	4	-3,108.7	212.9	0.00
	Distance to perennial stream	Linear	4	-3,129.7	254.8	0.00
	Distance to perennial stream	Expon. decay	4	-3,134.8	265.1	0.00

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to nearest stream	Expon. decay	4	-3,181.5	358.5	0.00
	Distance to intermittent stream	Expon. decay	4	-3,182.6	360.7	0.00
	Null	Null	3	-3,188.5	370.4	0.00
	Distance to nearest stream	Linear	4	-3,188.4	372.3	0.00
	Distance to intermittent stream	Linear	4	-3,188.5	372.4	0.00
Topography	Elevation	Linear	4	-2,759.4	0.0	1.00
	Topographic position index	2010 m	4	-3,144.6	770.3	0.00
	Roughness index	1 ha	4	-3,181.1	843.3	0.00
	Topographic position index	510 m	4	-3,186.7	854.6	0.00
	Null		3	-3,188.5	856.1	0.00

Table G2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Lone Willow subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Annual grass	661.4 ha	-1.26 (-1.70, -0.82)	Avoidance
Bare ground	61.5 ha	5.29 (3.63, 6.94)	Selection
Lowland shrub	661.4 ha	2.28 (1.25, 3.31)	Selection
Sagebrush	661.4 ha	4.72 (4.16, 5.29)	Selection
Upland shrub	661.4 ha	-1.59 (-3.04, -0.13)	Avoidance
Edge effects	661.4 ha	7.52 (6.47, 8.57)	Selection
Variety of edge types	661.4 ha	0.13 (0.11, 0.15)	Selection
Distance to perennial stream	Linear	-0.09 (-0.11, -0.08)	Selection
Distance to spring	Linear	-0.21 (-0.27, -0.15)	Selection
Distance to water body	Linear	-0.27 (-0.33, -0.22)	Selection
Distance to wet meadow	Linear	-0.20 (-0.26, -0.13)	Selection
Roughness index	1 ha	-1.28 (-2.07, -0.48)	Avoidance
Topographic position index	2010 m	-0.003 (-0.005, -0.002)	Avoided ridges / Selected valleys
Elevation	Linear	4.06 (3.70, 4.43)	Selection for Higher Elevations

Table G3. Lone Willow subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Annual grass	661.4 ha	0.107	0.0059	0.039	0.0064
Bare ground	61.5 ha	0.007	0.0009	0.011	0.0031
Edge effects	661.4 ha	0.129	0.0020	0.174	0.0037
Lowland shrub	661.4 ha	0.034	0.0028	0.014	0.0032
Sagebrush	661.4 ha	0.693	0.0070	0.749	0.0094
Upland shrub	661.4 ha	0.018	0.0012	0.037	0.0036
Variety of edge types	661.4 ha	7.38	0.0975	8.82	0.1664
Distance to perennial stream	Km	4.89	0.1048	3.82	0.2056
Distance to spring	Km	1.98	0.0376	1.40	0.0632
Distance to water body	Km	2.38	0.0378	1.86	0.0597
Distance to wet meadow	Km	1.91	0.0369	1.28	0.0571
Roughness index	1 ha	0.17	0.0025	0.17	0.0047
Topographic position index	2010 m	-0.95	1.4400	13.77	3.1791
Elevation	Km	1.68	0.059	1.84	0.0110

Appendix H. Supplemental Material for Midway RSF Modeling

Table H1. Variable selection results from the “proposal set” of variables from the Midway subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land- cover	Annual grass	61.5 ha	3	-8,485.2	0.0	0.9582
		8.7 ha	3	-8,488.7	6.9	0.0303
		Null	2	-8,491.1	9.7	0.0074
		661.4 ha	3	-8,490.7	11.0	0.0040
	Bare ground	8.7 ha	4	-8,489.0	0.0	0.4243
		Null	2	-8,491.1	0.1	0.4034
		61.5 ha	4	-8,490.3	2.7	0.1115
		661.4 ha	4	-8,490.9	3.9	0.0609
	Cropland	661.4 ha	4	-7,629.6	0.0	0.9992
		61.5 ha	4	-7,636.7	14.1	0.0008
		8.7 ha	4	-7,858.7	458.1	0.0000
		Null	2	-8,491.1	1,718.9	0.0000
	Forest	61.5 ha	3	-8,356.3	0.0	1.0000
		8.7 ha	3	-8,399.8	87.0	0.0000
		661.4 ha	3	-8,435.0	157.5	0.0000
		Null	2	-8,491.1	267.6	0.0000
	Lowland shrub	661.4 ha	3	-7,753.5	0.0	1.0000
		61.5 ha	3	-8,246.8	986.5	0.0000
		8.7 ha	3	-8,276.4	1,045.7	0.0000
		Null	2	-8,491.1	1,473.1	0.0000
	Perennial grass	61.5 ha	3	-8,486.2	0.0	0.9108
		661.4 ha	3	-8,488.9	5.4	0.0618
		Null	2	-8,491.1	7.6	0.0199
		8.7 ha	3	-8,491.0	9.6	0.0074
	Pinyon-juniper	661.4 ha	3	-7,115.7	0.0	1.0000
		61.5 ha	3	-7,143.4	55.5	0.0000
		8.7 ha	3	-7,388.0	544.6	0.0000
		Null	2	-8,491.1	2,748.7	0.0000
	Riparian	61.5 ha	3	-8,400.8	0.0	1.0000
		8.7 ha	3	-8,438.7	75.7	0.0000
		661.4 ha	3	-8,475.7	149.8	0.0000
		Null	2	-8,491.1	178.5	0.0000
	Sagebrush	661.4 ha	4	-8,457.8	0.0	1.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
		8.7 ha	4	-8,478.5	41.4	0.0000
		61.5 ha	4	-8,481.8	48.0	0.0000
		Null	2	-8,491.1	62.5	0.0000
	Upland shrub	61.5 ha	3	-8,429.7	0.0	1.0000
		8.7 ha	3	-8,466.1	72.6	0.0000
		661.4 ha	3	-8,488.0	116.5	0.0000
		Null	2	-8,491.1	120.6	0.0000
	Wet meadow	661.4 ha	3	-7,922.4	0.0	1.0000
		61.5 ha	3	-8,313.6	782.4	0.0000
		8.7 ha	3	-8,490.0	1,135.2	0.0000
		Null	2	-8,491.1	1,135.3	0.0000
Agriculture	Distance to cropland	Expon. decay	3	-8,341.2	0.0	1.0000
		Linear	3	-8,371.7	61.0	0.0000
		Null	2	-8,491.1	297.8	0.0000
Edge	Edge effects	661.4 ha	3	-,8442.5	0.0	1.0000
		8.7 ha	3	-8,480.3	75.5	0.0000
		61.5 ha	3	-8,486.5	88.0	0.0000
		Null	2	-8,491.1	95.1	0.0000
	Distance to edge	Expon. decay	3	-8,449.5	0.0	1.0000
		Linear	3	-8,474.7	50.4	0.0000
		Null	2	-8,491.1	81.2	0.0000
Landscape variation	Variety of edge types	61.5 ha	3	-8,452.1	0.0	0.9989
		661.4 ha	3	-8,459.0	13.8	0.0010
		8.7 ha	3	-8,462.0	19.8	0.0001
		Null	2	-8,491.0	75.8	0.0000
	Variety of land cover types	661.4 ha	3	-8,222.5	0.0	1.0000
		8.7 ha	3	-8,374.2	303.4	0.0000
		61.5 ha	3	-8,377.6	310.1	0.0000
		Null	2	-8,491.1	535.1	0.0000
Water sources	Distance to perennial stream	Expon. decay	3	-6,874.0	0.0	1.0000
	Distance to perennial stream	Linear	3	-6,898.7	49.2	0.0000
	Distance to water body	Expon. decay	3	-7,302.3	856.5	0.0000
	Distance to water body	Linear	3	-7,519.7	1,291.3	0.0000
	Distance to spring	Expon. decay	3	-8,227.0	2,706.0	0.0000
	Distance to spring	Linear	3	-8,312.4	2,876.7	0.0000
	Distance to wet Meadow	Expon. decay	3	-8,330.9	2,913.8	0.0000
	Distance to Wet Meadow	Linear	3	-8,348.9	2,949.7	0.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to Nearest Stream	Linear	3	-8,361.8	2,975.4	0.0000
	Distance to Nearest Stream	Expon. decay	3	-8,418.1	3,088.2	0.0000
	Distance to Intermittent Stream	Linear	3	-8,445.9	3,143.7	0.0000
	Distance to Intermittent Stream	Expon. decay	3	-8,480.2	3,212.4	0.0000
	Null	Null	2	-8,491.1	3,232.0	0.0000
Topography	Roughness Index	1 ha	3	-7,521.8	0.0	1.0000
	Elevation	Linear	3	-7,983.2	922.8	0.0000
	Topographic Position Index	2010 m	3	-8,392.4	1,741.1	0.0000
	Topographic Position Index	510 m	3	-8,486.5	1,929.5	0.0000
	Null		2	-8,491.1	1,936.5	0.0000

Table H2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Midway subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Annual grass	61.5 ha	-6.32 (-11.82, -0.82)	Avoidance
Cropland	661.4 ha	14.20 (12.94, 15.47)	Selection
Forest	61.5 ha	-42.07 (-51.78, -32.37)	Avoidance
Lowland shrubs	661.4 ha	1.92 (1.75, 2.09)	Selection
Perennial grass	Linear	-7.82 (-10.95, -4.69)	Avoidance
Pinyon-juniper	Linear	-13.63 (-14.57, -12.68)	Avoidance
Riparian	Linear	-2.68 (-4.38, -0.98)	Avoidance
Sagebrush	661.4 ha	0.98 (0.8, 1.15)	Selection
Edge effects	661.4 ha	-7.51 (-8.43, -6.58)	Avoidance
Distance to edge	Expon. Decay	-0.37 (-0.50, -0.24)	Avoidance
Variety of land cover types	661.4 ha	0.26 (0.24, 0.28)	Selection
Distance to perennial stream	Expon. Decay	5.21 (5, 5.43)	Selection
Distance to spring	Expon. Decay	3.91 (3.70, 4.13)	Selection
Distance to water body	Expon. Decay	3.95 (3.76, 4.15)	Selection
Distance to wet meadow	Expon. Decay	17.86 (16.21, 19.50)	Selection
Roughness index	1 ha	-14.59 (-15.37, -13.81)	Avoidance
Topographic position index	2010 m	-0.006 (-0.007, -0.004)	Avoided Ridges / Selected Valleys
Elevation	Linear	-4.06 (-4.32, -3.79)	Selection for Lower Elevations

Table H3. Midway subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Annual grass	61.5 ha	0.001	0.0002	0.0007	0.0001
Cropland	661.4 ha	0.006	0.0005	0.038	0.0016
Forest	61.5 ha	0.010	0.0009	0.0003	0.0001
Lowland shrubs	661.4 ha	0.169	0.0034	0.347	0.0072
Perennial grass	61.5 ha	0.003	0.0003	0.004	0.0005
Pinyon-juniper	661.4 ha	0.177	0.0033	0.014	0.0012
Riparian	61.5 ha	0.004	0.0002	0.010	0.0011
Sagebrush	661.4 ha	0.624	0.0039	0.584	0.0067
Edge effects	661.4 ha	0.13	0.0007	0.14	0.0017
Distance to edge	Km	0.15	0.0025	0.13	0.0054
Variety of land cover types	661.4 ha	5.24	0.0206	6.16	0.0755
Distance to perennial stream	Km	8.49	0.0656	3.71	0.1068
Distance to spring	Km	4.72	0.0341	3.82	0.0795
Distance to water body	Km	4.42	0.0407	2.25	0.0611
Distance to wet meadow	Km	10.55	0.1796	6.85	0.0656
Roughness index	1 ha	0.15	0.0012	0.09	0.0015
Topographic position index	2010 m	-0.63	0.5626	-8.80	0.4314
Elevation	Km	2.00	0.0027	1.90	0.0055

Appendix I. Supplemental Material for Sheldon RSF Modeling

Table I1. Variable selection results from the "proposal set" of variables from the Sheldon subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	61.5 ha	4	-712.8	0.0	0.2921
		661.4 ha	4	-712.9	0.1	0.2722
		Null	3	-713.9	0.3	0.2527
		8.7 ha	4	-713.2	0.9	0.1830
	Bare ground	8.7 ha	4	-711.2	0.0	0.6708
		661.4 ha	4	-712.5	2.7	0.1724
		Null	3	-713.9	3.5	0.1150
		61.5 ha	4	-713.9	5.6	0.0418
	Cropland	661.4 ha	4	-709.1	0.0	0.9649
		Null	3	-713.9	7.7	0.0203
		61.5 ha	4	-713.2	8.4	0.0147
		8.7 ha	No Cropland at 9ha scale			
	Forest	61.5 ha	4	-712.0	0.0	0.5465
		Null	3	-713.9	1.9	0.2084
		8.7 ha	4	-713.2	2.4	0.1617
		661.4 ha	4	-713.8	3.8	0.0834
	Lowland shrub	Null	3	-713.9	0.0	0.4027
		661.4 ha	4	-713.4	1.0	0.2415
		61.5 ha	4	-713.7	1.6	0.1811
		8.7 ha	4	-713.8	1.7	0.1746
	Perennial grass	8.7 ha	4	-712.3	0.0	0.3720
		61.5 ha	4	-712.7	0.9	0.2396
		661.4 ha	4	-712.9	1.3	0.1945
		Null	3	-713.9	1.3	0.1939
	Pinyon-juniper	661.4 ha	4	-712.6	0.0	0.3884
		Null	3	-713.9	0.6	0.2875
		61.5 ha	4	-713.2	1.1	0.2199
		8.7 ha	4	-713.9	2.6	0.1042
	Riparian	Null	3	-713.9	0.0	0.3553
		8.7 ha	4	-713.2	0.6	0.2573
		661.4 ha	4	-713.3	0.8	0.2382
		61.5 ha	4	-713.8	1.7	0.1492

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Sagebrush	661.4 ha	4	-712.8	0.0	0.3451
		Null	3	-713.9	0.2	0.3163
		8.7 ha	4	-713.3	0.9	0.2241
		61.5 ha	4	-713.9	2.2	0.1145
	Upland shrub	661.4 ha	4	-711.0	0.0	0.6913
		8.7 ha	4	-712.6	3.3	0.1359
		Null	3	-713.9	3.9	0.0963
		61.5 ha	4	-713.2	4.4	0.0766
	Wet meadow	Null	3	-713.9	0.0	0.3135
		8.7 ha	4	-713.0	0.1	0.2931
		61.5 ha	4	-713.3	0.8	0.2127
		661.4 ha	4	-713.5	1.1	0.1807
Agriculture	Distance to cropland	Expon. decay	4	-711.6	0.0	0.6977
		Null	3	-713.9	2.6	0.1876
		Linear	4	-713.4	3.6	0.1147
Edge	Edge effects	661.4 ha	4	-706.4	0.0	0.9193
		61.5 ha	4	-709.0	5.1	0.0729
		8.7 ha	4	-711.4	9.9	0.0065
		Null	3	-713.9	13.0	0.0014
	Distance to edge	Expon. decay	4	-710.8	0.0	0.8100
		Null	3	-713.9	4.3	0.0960
		Linear	4	-712.9	4.3	0.0940
Landscape variation	Variety of edge types	8.7 ha	4	-707.7	0.0	0.5500
		661.4 ha	4	-708.0	0.5	0.4326
		61.5 ha	4	-711.4	7.3	0.0144
		Null	3	-713.9	10.4	0.0030
	Variety of land cover types	8.7 ha	4	-704.9	0.0	0.9954
		661.4 ha	4	-710.7	11.7	0.0029
		61.5 ha	4	-711.4	13.1	0.0014
		Null	3	-713.9	16.1	0.0003
Water source	Distance to perennial stream	Expon. decay	4	-709.2	0.0	0.4544
	Distance to water body	Expon. decay	4	-710.1	1.8	0.1830
	Distance to water body	Linear	4	-710.9	3.4	0.0833
	Distance to spring	Expon. decay	4	-710.9	3.4	0.0819
	Distance to wet meadow	Linear	4	-711.2	4.0	0.0608
	Distance to spring	Linear	4	-711.8	5.2	0.0329
	Distance to perennial stream	Linear	4	-711.8	5.3	0.0317
	Distance to wet meadow	Expon. decay	4	-712.5	6.6	0.0165

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Null	Null	3	-713.9	7.5	0.0106
	Distance to intermittent stream	Expon. decay	4	-713.7	9.0	0.0051
	Distance to nearest stream	Expon. decay	4	-713.7	9.1	0.0048
	Distance to intermittent stream	Linear	4	-713.9	9.5	0.0040
	Distance to nearest stream	Linear	4	-713.9	9.5	0.0038
Topography	Topographic position index	2010 m	4	-707.6	0.0	0.8649
	Elevation	Linear	4	-709.6	4.0	0.1175
	Roughness index	1 ha	4	-712.1	9.0	0.0098
	Null		3	-713.9	10.7	0.0041
	Topographic position index	510 m	4	-713.0	10.9	0.0037

Table I2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Sheldon subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Upland shrubs	661.4 ha	-5.25 (-8.31, -2.19)	Avoidance
Edge effects	661.4 ha	-5.11 (-7.48, -2.75)	Avoidance
Variety of land cover types	8.7 ha	-0.39 (-0.55, -0.22)	Avoidance
Distance to perennial stream	Exponential decay	-1.15 (-1.86, -0.44)	Avoidance
Distance to water body	Exponential decay	0.77 (0.21, 1.33)	Selection
Topographic position index	2010 m	0.01 (0.005, 0.015)	Selected ridges/ Avoided valleys
Elevation	Linear	4.52 (2.87, 6.16)	Selection for Higher Elevations

Table I3. Sheldon subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Upland shrubs	661.4 ha	0.021	0.0028	0.017	0.0052
Edge effects	661.4 ha	0.063	0.0029	0.058	0.0057
Variety of land cover types	8.7 ha	1.59	0.0425	1.48	0.0836
Distance to perennial stream	Km	8.31	0.1930	8.80	0.3469
Distance to spring	Km	3.25	0.0980	3.23	0.2042
Distance to water body	Km	1.82	0.0669	1.66	0.1500
Topographic position index	2010 m	0.26	1.234	6.09	3.1746
Elevation	Km	1.84	0.0052	1.87	0.0042

Appendix J. Supplemental material for South Fork-Ruby Valley RSF modeling

Table J1. Variable selection results from the "proposal set" of variables from the South Fork-Ruby Valley subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-4,771.8	0.0	1.0000
		61.5 ha	4	-4,806.2	68.8	0.0000
		8.7 ha	4	-4,815.9	88.0	0.0000
		Null	3	-4,879.6	213.5	0.0000
	Bare ground	661.4 ha	4	-4,524.7	0.0	1.0000
		61.5 ha	4	-4,697.9	346.5	0.0000
		8.7 ha	4	-4,762.2	475.0	0.0000
		Null	3	-4,879.6	707.8	0.0000
	Cropland	8.7 ha	4	-4,858.7	0.0	1.0000
		661.4 ha	4	-4,875.0	32.6	0.0000
		61.5 ha	4	-4,877.5	37.5	0.0000
		Null	3	-4,879.6	39.7	0.0000
	Forest	661.4 ha	4	-4,676.0	0.0	0.9999
		61.5 ha	4	-4,685.4	18.7	0.0001
		8.7 ha	4	-4,697.6	43.1	0.0000
		Null	3	-4,879.6	405.1	0.0000
	Lowland shrub	661.4 ha	4	-4,792.9	0.0	1.0000
		61.5 ha	4	-4,807.1	28.4	0.0000
		8.7 ha	4	-4,820.7	55.7	0.0000
		Null	3	-4,879.6	171.4	0.0000
	Perennial grass	661.4 ha	4	-4,839.3	0.0	1.0000
		61.5 ha	4	-4,871.9	65.1	0.0000
		8.7 ha	4	-4,872.8	67.0	0.0000
		Null	3	-4,879.6	78.5	0.0000
	Pinyon-juniper	61.5 ha	4	-4,723.8	0.0	1.0000
		661.4 ha	4	-4,759.7	71.8	0.0000
		8.7 ha	4	-4,767.9	88.2	0.0000
		Null	3	-4,879.6	309.5	0.0000
	Riparian	661.4 ha	4	-4,756.2	0.0	1.0000
		61.5 ha	4	-4,788.6	64.9	0.0000
		8.7 ha	4	-4,842.3	172.1	0.0000
		Null	3	-4,879.6	244.7	0.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Sagebrush	661.4 ha	4	-4,329.6	0.0	1.0000
		61.5 ha	4	-4,387.8	116.4	0.0000
		8.7 ha	4	-4,411.1	163.0	0.0000
		Null	3	-4,879.6	1097.9	0.0000
	Upland shrub	8.7 ha	4	-4,751.7	0.0	1.0000
		661.4 ha	4	-4,762.3	21.2	0.0000
		61.5 ha	4	-4,826.4	149.3	0.0000
		Null	3	-4,879.6	253.7	0.0000
	Wet meadow	61.5 ha	4	-4,858.7	0.0	0.9982
		661.4 ha	4	-4,865.0	12.6	0.0018
		8.7 ha	4	-4,875.1	32.8	0.0000
		Null	3	-4,879.6	39.8	0.0000
Agriculture	Distance to cropland	Expon. decay	4	-4,877.6	0.0	0.5677
		Linear	4	-4,878.6	1.9	0.2180
		Null	3	-4,879.6	1.9	0.2143
Edge	Edge effects	661.4 ha	4	-4,666.1	0.0	1.0000
		61.5 ha	4	-4,779.4	226.5	0.0000
		8.7 ha	4	-4,796.0	259.6	0.0000
		Null	3	-4,879.6	424.9	0.0000
	Distance to edge	Linear	4	-4,863.8	0.0	0.5357
		Expon. decay	4	-4,863.9	0.3	0.4643
		Null	3	-4,879.6	29.6	0.0000
Landscape variation	Variety of edge types	8.7 ha	4	-4,825.0	0.0	0.9801
		61.5 ha	4	-4,828.9	7.8	0.0199
		661.4 ha	4	-4,861.4	72.7	0.0000
		Null	3	-4,879.6	107.1	0.0000
	Variety of land cover types	8.7 ha	4	-4,772.8	0.0	1.0000
		61.5 ha	4	-4,818.2	90.7	0.0000
		661.4 ha	4	-4,874.0	202.4	0.0000
		Null	3	-4,879.6	211.6	0.0000
Water source	Distance to water body	Expon. decay	4	-4,760.0	0.0	1.0000
	Distance to nearest stream	Expon. decay	4	-4,787.2	54.4	0.0000
	Distance to spring	Linear	4	-4,836.6	153.2	0.0000
	Distance to water body	Linear	4	-4,839.3	158.6	0.0000
	Distance to nearest stream	Linear	4	-4,844.4	168.9	0.0000
	Distance to intermittent stream	Linear	4	-4,846.1	172.2	0.0000
	Distance to intermittent stream	Expon. decay	4	-4,847.0	174.1	0.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to wet meadow	Linear	4	-4,856.5	192.9	0.0000
	Distance to spring	Expon. decay	4	-4,866.1	212.1	0.0000
	Distance to perennial stream	Expon. decay	4	-4,873.8	227.6	0.0000
	Distance to wet meadow	Expon. decay	4	-4,877.6	235.2	0.0000
	Null	Null	3	-4,879.6	237.2	0.0000
	Distance to perennial stream	Linear	4	-4,879.4	238.9	0.0000
Topography	Roughness index	1 ha	4	-4,788.5	0.0	1.0000
	Elevation	Linear	4	-4,843.9	111.0	0.0000
	Topographic position index	2010 m	4	-4,871.7	166.5	0.0000
	Null		3	-4,879.6	180.2	0.0000
	Topographic position index	510 m	4	-4,879.1	181.2	0.0000

Table J2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the South Fork-Ruby Valley subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Annual grass	661.4 ha	-18.77 (-22.97, -14.57)	Avoidance
Cropland	8.7 ha	0.74 (0.41, 1.08)	Selection
Forest	661.4 ha	-3.98 (-5.16, -2.80)	Avoidance
Lowland shrubs	661.4 ha	-0.86 (-1.57, -0.15)	Avoidance
Perennial grass	661.4 ha	2.13 (0.84, 3.42)	Selection
Pinyon-juniper	61.5 ha	-17.31 (-21.23, -13.39)	Avoidance
Sagebrush	661.4 ha	3.77 (3.50, 4.04)	Selection
Distance to nearest stream	Exponential decay	0.94 (0.76, 1.13)	Selection
Distance to spring	Linear	0.01 (0.002, 0.020)	Avoidance
Distance to water body	Exponential decay	-0.35 (-0.59, -0.11)	Avoidance
Roughness index	1 ha	-2.34 (-2.94, -1.73)	Avoidance
Topographic position index	2010 m	-0.002 (-0.002, -0.001)	Avoided ridges / Selected valleys
Elevation	Linear	0.44 (0.22, 0.67)	Selection for higher elevations

Table J3. South Fork-Ruby Valley subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Annual grass	661.4 ha	0.0233	0.0024	0.0034	0.0007
Cropland	8.7 ha	0.0624	0.0074	0.0357	0.0114
Forest	661.4 ha	0.0575	0.0033	0.0150	0.0025
Lowland shrubs	661.4 ha	0.0725	0.0055	0.0209	0.0047
Perennial grass	661.4 ha	0.0334	0.0019	0.0176	0.0031
Pinyon-juniper	61.5 ha	0.0375	0.0045	0.0046	0.0016
Sagebrush	661.4 ha	0.6043	0.0088	0.8105	0.0142
Edge effects	661.4 ha	0.17	0.0029	0.13	0.0045
Distance to water body	Km	2.50	0.0716	2.95	0.0641
Distance to nearest stream	Km	0.45	0.0096	0.55	0.0222
Distance to spring	Km	5.24	0.1617	6.15	0.4236
Roughness index	1 ha	0.16	0.004	0.12	0.0055
Topographic position index	2010 m	-1.94	2.1853	-8.00	2.2769
Elevation	Km	2.00	0.0110	1.94	0.0101

Appendix K. Supplemental Material for Toiyabe RSF Modeling

Table K1. Variable selection results from the “proposal set” of variables from the Toiyabe subregion, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	8.7 ha	4	-48,876.8	0.0	1.0000
		61.5 ha	4	-48,886.9	20.2	0.0000
		661.4 ha	4	-48,892.2	30.8	0.0000
		Null	3	-48,901.5	47.5	0.0000
	Bare ground	661.4 ha	4	-48,735.8	0.0	1.0000
		61.5 ha	4	-48,752.3	32.9	0.0000
		8.7 ha	4	-48,844.0	216.3	0.0000
		Null	3	-48,901.5	329.5	0.0000
	Cropland	61.5 ha	4	-48,818.2	0.0	0.9999
		8.7 ha	4	-48,827.9	19.4	0.0001
		661.4 ha	4	-48,899.5	162.7	0.0000
		Null	3	-48,901.5	164.6	0.0000
	Forest	661.4 ha	4	-48,840.4	0.0	1.0000
		8.7 ha	4	-48,860.8	40.8	0.0000
		61.5 ha	4	-48,884.4	88.0	0.0000
		Null	3	-48,901.5	120.3	0.0000
	Lowland shrub	661.4 ha	4	-45,850.6	0.0	1.0000
		61.5 ha	4	-46,806.1	1,911.1	0.0000
		8.7 ha	4	-47,254.2	2,807.2	0.0000
		Null	3	-48,901.5	6,099.9	0.0000
	Perennial grass	61.5 ha	4	-48,849.8	0.0	1.0000
		8.7 ha	4	-48,867.4	35.2	0.0000
		661.4 ha	4	-48,897.0	94.4	0.0000
		Null	3	-48,901.5	101.4	0.0000
	Pinyon-juniper	61.5 ha	4	-44,548.9	0.0	1.0000
		661.4 ha	4	-44,793.6	489.4	0.0000
		8.7 ha	4	-45,162.5	1,227.2	0.0000
		Null	3	-48,901.5	8,703.3	0.0000
	Riparian	61.5 ha	4	-48,453.7	0.0	1.0000
		661.4 ha	4	-48,582.4	257.4	0.0000
		8.7 ha	4	-48,621.0	334.6	0.0000
		Null	3	-48,901.5	893.7	0.0000
	Sagebrush	661.4 ha	4	-44,570.0	0.0	1.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
		61.5 ha	4	-45,334.9	1,529.8	0.0000
		8.7 ha	4	-46,099.1	3,058.1	0.0000
		Null	3	-48,901.5	8,661.0	0.0000
	Upland shrub	661.4 ha	4	-47,877.1	0.0	1.0000
		61.5 ha	4	-48,675.2	1,596.1	0.0000
		8.7 ha	4	-48,737.9	1,721.6	0.0000
		Null	3	-48,901.5	2,046.9	0.0000
	Wet meadow	61.5 ha	4	-48,805.2	0.0	1.0000
		661.4 ha	4	-48,845.9	81.2	0.0000
		8.7 ha	4	-48,877.2	143.9	0.0000
		Null	3	-48,901.5	190.6	0.0000
Agriculture	Distance to cropland	Linear	4	-46,777.2	0.0	1.0000
		Exponential decay	4	-47,546.0	1,537.5	0.0000
		Null	3	-48,901.5	4,246.6	0.0000
Edge	Edge effects	661.4 ha	4	-47,995.8	0.0	1.0000
		61.5 ha	4	-48,023.2	54.7	0.0000
		8.7 ha	4	-48,142.1	292.6	0.0000
		Null	3	-48,901.5	1,809.4	0.0000
	Distance to edge	Linear	4	-47,791.3	0.0	1.0000
		Exponential decay	4	-48,112.6	642.6	0.0000
		Null	3	-48,901.5	2,218.5	0.0000
Landscape variation	Variety of edge types	661.4 ha	4	-48,121.7	0.0	1.0000
		61.5 ha	4	-48,141.7	40.0	0.0000
		8.7 ha	4	-48,277.1	310.8	0.0000
		Null	3	-48,901.5	1,557.7	0.0000
	Variety of land cover types	661.4 ha	4	-47,448.5	0.0	1.0000
		61.5 ha	4	-48,161.9	1,426.8	0.0000
		8.7 ha	4	-48,425.5	1,954.1	0.0000
		Null	3	-48,901.5	2,904.2	0.0000
Water source	Distance to spring	Linear	4	-43,299.1	0.0	1.0000
	Distance to spring	Expon. decay	4	-43,787.5	976.8	0.0000
	Distance to wet meadow	Linear	4	-44,519.0	2,439.7	0.0000
	Distance to wet meadow	Expon. decay	4	-45,892.0	5,185.8	0.0000
	Distance to perennial stream	Linear	4	-46,280.0	5,961.9	0.0000
	Distance to water body	Linear	4	-46,990.7	7,383.2	0.0000
	Distance to water body	Expon. decay	4	-47,811.0	9,023.9	0.0000
	Distance to perennial stream	Expon. decay	4	-48,196.7	9,795.2	0.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to intermittent stream	Linear	4	-48,727.5	10,856.9	0.0000
	Distance to nearest stream	Linear	4	-48,829.5	11,060.8	0.0000
	Distance to intermittent stream	Expon. decay	4	-48,858.0	11,117.8	0.0000
	Distance to nearest stream	Expon. decay	4	-48,893.2	11,188.2	0.0000
	Null	Null	3	-48,901.5	11,202.9	0.0000
Topography	Elevation	Linear	4	-46,678.2	0.0	1.0000
	Roughness index	1 ha	4	-48,509.2	3,662.1	0.0000
	Topographic position index	510 m	4	-48,899.1	4,441.8	0.0000
	Null		3	-48,901.5	4,444.7	0.0000
	Topographic position index	2010 m	4	-48,918.4	4,480.4	0.0000

Table K2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Toiyabe subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Annual grass	8.7 ha	-1.85 (-2.20, -1.49)	Avoidance
Lowland shrubs	661.4 ha	-35.06 (-36.84, -33.28)	Avoidance
Pinyon-juniper	61.5 ha	-6.16 (-6.32, -6.00)	Avoidance
Riparian	61.5 ha	14.08 (13.43, 14.72)	Selection
Sagebrush	661.4 ha	4.73 (4.62, 4.84)	Selection
Upland shrubs	661.4 ha	15.36 (14.81, 15.91)	Selection
Distance to cropland	Exponential decay	-0.21 (-0.22, -0.20)	Avoidance
Distance to edge	Linear	-2.66 (-2.74, -2.59)	Selection
Variety of land cover types	661.4 ha	0.40 (0.39, 0.41)	Selection
Distance to perennial stream	Linear	-0.24 (-0.24, -0.23)	Selection
Distance to spring	Linear	-0.57 (-0.59, -0.56)	Selection
Distance to water body	Linear	-0.21 (-0.22, -0.21)	Selection
Distance to wet meadow	Linear	-0.18 (-0.18, -0.18)	Selection
Roughness index	1 ha	8.61 (8.38, 8.85)	Selection
Elevation	Linear	4.21 (4.11, 4.31)	Selection for Higher Elevations

Table K3. Toiyabe subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Annual grass	8.7 ha	0.0043	0.0004	0.0025	0.0006
Lowland shrubs	661.4 ha	0.0417	0.0009	0.0018	0.0002
Pinyon-juniper	61.5 ha	0.193	0.0023	0.055	0.0015
Riparian	61.5 ha	0.013	0.0002	0.035	0.0015
Sagebrush	661.4 ha	0.727	0.0020	0.842	0.0023
Upland shrubs	661.4 ha	0.008	0.0002	0.032	0.0010
Variety of land cover types	661.4 ha	5.08	0.0130	6.12	0.0264
Distance to edge	Km	0.23	0.0022	0.10	0.0024
Distance to cropland	Km	4.54	0.0230	3.34	0.0316
Distance to perennial stream	Km	5.48	0.0317	2.86	0.0339
Distance to spring	Km	3.27	0.0213	1.34	0.0188
Distance to water body	Km	6.05	0.0235	5.13	0.0389
Distance to wet meadow	Km	12.83	0.0442	8.59	0.0820
Roughness index	1 ha	0.17	0.0007	0.21	0.0013
Elevation	Km	2.08	0.0015	2.25	0.0041

Appendix L. Supplemental Material for Virginia Mountains RSF Modeling

Table L1. Variable selection results from the “proposal set” of variables from the Virginia Mountains, Nevada.

[The top-ranked variable in each set was retained in the suite of candidate variables for resource selection function (RSF) modeling if they performed better than the null model and if confidence intervals around estimated mean effects did not overlap zero]

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
Land cover	Annual grass	661.4 ha	4	-2,086.4	0.0	1.0000
		61.5 ha	4	-2,155.5	138.3	0.0000
		8.7 ha	4	-2,186.3	199.9	0.0000
		Null	3	-2,452.4	730.0	0.0000
	Bare ground	661.4 ha	4	-2,347.4	0.0	1.0000
		61.5 ha	4	-2,419.7	144.6	0.0000
		8.7 ha	4	-2,421.1	147.4	0.0000
		Null	3	-2,452.4	207.9	0.0000
	Cropland	661.4 ha	4	-2,322.6	0.0	1.0000
		61.5 ha	4	-2,384.8	124.3	0.0000
		8.7 ha	4	-2,412.1	179.0	0.0000
		Null	3	-2,452.4	257.5	0.0000
	Forest	661.4 ha	4	-2,429.1	0.0	1.0000
		Null	3	-2,452.4	44.5	0.0000
		8.7 ha	4	-2,451.8	45.4	0.0000
		61.5 ha	4	-2,452.1	46.0	0.0000
	Lowland shrub	8.7 ha	4	-2,435.4	0.0	0.9958
		61.5 ha	4	-2,440.8	10.9	0.0042
		661.4 ha	4	-2,448.9	27.0	0.0000
		Null	3	-2,452.4	31.9	0.0000
	Perennial grass	8.7 ha	4	-2,445.1	0.0	0.6819
		661.4 ha	4	-2,445.9	1.5	0.3162
		Null	3	-2,452.4	12.5	0.0013
		61.5 ha	4	-2,452.2	14.3	0.0005
	Pinyon-juniper	8.7 ha	4	-2,422.1	0.0	0.9999
		61.5 ha	4	-2,431.5	18.9	0.0001
		661.4 ha	4	-2,442.4	40.7	0.0000
		Null	3	-2,452.4	58.6	0.0000
	Riparian	8.7 ha	4	-2,439.6	0.0	0.9921
		61.5 ha	4	-2,444.7	10.0	0.0066
		661.4 ha	4	-2,446.3	13.3	0.0013
		Null	3	-2,452.4	23.4	0.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Sagebrush	8.7 ha	4	-2,429.8	0.0	0.9574
		61.5 ha	4	-2,432.9	6.2	0.0425
		661.4 ha	4	-2,439.4	19.1	0.0001
		Null	3	-2,452.4	43.1	0.0000
	Upland shrub	61.5 ha	4	-2,443.7	0.0	0.9928
		661.4 ha	4	-2,448.7	10.1	0.0065
		Null	3	-2,452.4	15.3	0.0005
		8.7 ha	4	-2,452.1	16.7	0.0002
	Wet meadow	8.7 ha	4	-2,438.4	0.0	0.9922
		661.4 ha	4	-2,443.2	9.7	0.0077
		61.5 ha	4	-2,450.8	24.8	0.0000
		Null	3	-2,452.4	26.0	0.0000
Agriculture	Distance to cropland	Expon. decay	4	-2,349.8	0.0	1.0000
		Linear	4	-2,388.7	77.6	0.0000
		Null	3	-2,452.4	203.0	0.0000
Edge	Edge effects	661.4 ha	4	-2,004.1	0.0	1.0000
		61.5 ha	4	-2,174.7	341.1	0.0000
		8.7 ha	4	-2,302.1	595.9	0.0000
		Null	3	-2,452.4	894.5	0.0000
	Distance to edge	Linear	4	-2,236.0	0.0	1.0000
		Expon. decay	4	-2,364.6	257.2	0.0000
		Null	3	-2,452.4	430.7	0.0000
Landscape variation	Variety of edge types	8.7 ha	4	-2,331.8	0.0	1.0000
		61.5 ha	4	-2,360.1	56.8	0.0000
		661.4 ha	4	-2,447.6	231.7	0.0000
		Null	3	-2,452.4	239.2	0.0000
	Variety of land cover types	8.7 ha	4	-2,424.0	0.0	0.9997
		61.5 ha	4	-2,432.3	16.6	0.0003
		Null	3	-2,452.4	54.7	0.0000
		661.4 ha	4	-2,452.2	56.5	0.0000
Water source	Distance to spring	Expon. decay	4	-2,322.0	0.0	1.0000
	Distance to spring	Linear	4	-2,364.5	85.1	0.0000
	Distance to wet meadow	Linear	4	-2,399.1	154.2	0.0000
	Distance to water body	Expon. decay	4	-2,403.7	163.5	0.0000
	Distance to perennial stream	Expon. decay	4	-2,416.7	189.5	0.0000
	Distance to intermittent stream	Linear	4	-2,417.9	191.9	0.0000

Group	Variable	Scale/distance function	K	Log likelihood	ΔAICc	Model weight
	Distance to water body	Linear	4	-2,426.8	209.6	0.0000
	Distance to perennial stream	Linear	4	-2,429.2	214.4	0.0000
	Distance to wet meadow	Expon. decay	4	-2,439.6	235.2	0.0000
	Distance to nearest stream	Expon. decay	4	-2,445.1	246.3	0.0000
	Distance to nearest stream	Linear	4	-2,449.6	255.3	0.0000
	Distance to intermittent stream	Expon. decay	4	-2,450.3	256.7	0.0000
	Null	Null	3	-2,452.4	258.8	0.0000
Topography	Elevation	Linear	4	-2,112.4	0.0	1.0000
	Topographic position index	2010 m	4	-2,320.7	416.7	0.0000
	Topographic position index	510 m	4	-2,424.7	624.6	0.0000
	Roughness index	1 ha	4	-2,437.1	649.5	0.0000
	Null		3	-2,452.4	677.9	0.0000

Table L2. Model averaged parameter estimates and 95-percent confidence intervals for candidate variables included in the Virginia Mountains subregional resource selection function (RSF) model, Nevada.

Variable	Scale/distance function	Model averaged estimate (95% confidence interval)	Selection/Avoidance
Annual grass	661.4 ha	5.42 (4.80, 6.03)	Selection
Lowland shrubs	8.7 ha	0.68 (0.42, 0.94)	Selection
Pinyon-juniper	8.7 ha	-3.67 (-4.00, -3.33)	Avoidance
Riparian	8.7 ha	-20.31 (-26.14, -14.48)	Avoidance
Sagebrush	8.7 ha	0.72 (0.52, 0.92)	Selection
Distance to cropland	Exponential decay	-1.24 (-1.60, -0.87)	Avoidance
Edge effects	661.4 ha	17.91 (16.65, 19.17)	Selection
Variety of edge types	8.7 ha	-0.22 (-0.3, -0.13)	Avoidance
Distance to perennial stream	Exponential decay	-2.90 (-3.26, -2.54)	Avoidance
Distance to spring	Exponential decay	1.06 (0.71, 1.41)	Selection
Distance to water body	Exponential decay	-2.88 (-3.26, -2.49)	Avoidance
Distance to wet meadow	Linear	-0.07 (-0.10, -0.04)	Selection
Roughness index	1 ha	-1.30 (-2.2, -0.39)	Avoidance
Topographic position index	2010 m	0.008 (0.007, 0.009)	Selected ridges/ Avoided valleys
Elevation	Linear	5.05 (4.70, 5.40)	Selection for higher elevations

Table L3. Virginia Mountains subregional resource selection function (RSF) variable means and standard errors within all available habitats and habitats used by greater sage-grouse (*Centrocercus urophasianus*), Nevada.

Variable	Scale	Available habitats		Used habitats	
		Mean	Standard error	Mean	Standard error
Annual grass	661.4 ha	0.038	0.0013	0.321	0.0051
Lowland shrubs	8.7 ha	0.150	0.0052	0.015	0.0038
Pinyon-juniper	8.7 ha	0.235	0.0058	0.211	0.0100
Riparian	8.7 ha	0.005	0.0005	0.003	0.0006
Sagebrush	8.7 ha	0.416	0.0065	0.354	0.0097
Edge effects	661.4 ha	0.14	0.0011	0.27	0.0018
Variety of edge types	8.7 ha	1.35	0.0179	2.37	0.0351
Distance to cropland	Km	3.62	0.0385	4.77	0.0575
Distance to perennial stream	Km	5.51	0.0618	4.91	0.0999
Distance to spring	Km	2.51	0.0300	1.12	0.0224
Distance to water body	Km	2.63	0.0269	2.29	0.0454
Distance to wet meadow	Km	5.26	0.0480	3.90	0.0467
Roughness index	1 ha	0.20	0.0017	0.22	0.0022
Topographic position index	2010 m	0.59	0.9103	31.65	2.5552
Elevation	Km	1.57	0.0049	2.03	0.0079

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U.S. Fish & Wildlife Service

Greater Sage-Grouse

Range-Wide Mitigation Framework

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Greater Sage-Grouse

Range-Wide Mitigation Framework

DOCUMENT STRUCTURE

PART I	provides general goals and regulatory considerations for any mitigation program within the context of the mitigation hierarchy
PART II	provides overarching mitigation principles, standards, and recommendations for the development of mitigation processes and programs
APPENDIX I	glossary of important terms, *italicized* on first use in this document
APPENDIX II	detailed questions to consider when developing or assessing a mitigation program

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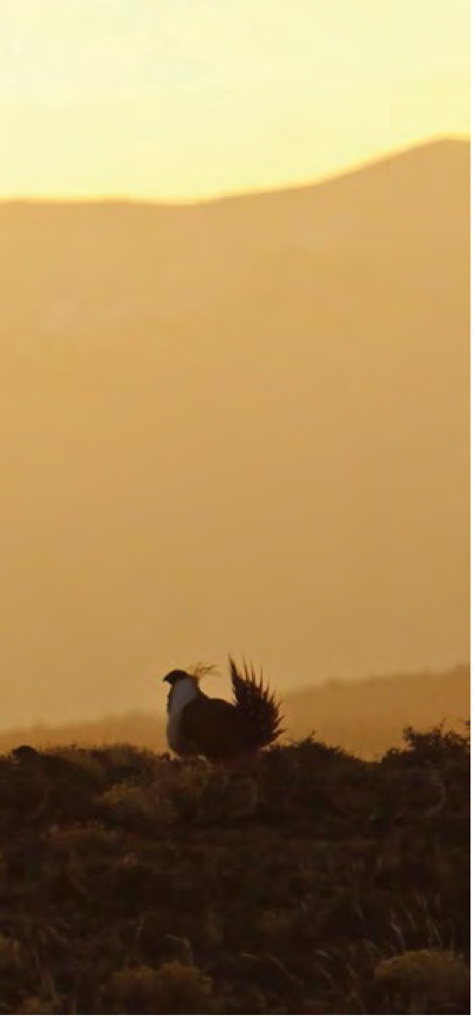

Document Purpose

In 2010, the U. S. Fish and Wildlife Service (Service) determined that the greater sage-grouse (Centrocercus urophasianus; hereafter sage-grouse) warranted protections under the Endangered Species Act (ESA). This finding was based on two primary factors: 1) the present or threatened destruction, modification, or curtailment of habitat or range, and 2) the inadequacy of existing regulatory mechanisms.

The purpose of this document (Framework) is to communicate some of the factors the Service is likely to consider in evaluating the efficacy of mitigation practices and programs in reducing threats to sage-grouse. The recommendations provided here are consistent with the information and conservation objectives provided in the 2013 Conservation Objectives Team (COT) Report[1] for sage-grouse.

The Service recommends an avoidance first strategy be employed for all identified sage-grouse habitat, especially *Priority Areas for Conservation* (PACs) and other areas of habitat identified as important to sage-grouse populations. Unavoidable impacts occurring in any sage-grouse habitat should be fully compensated.

This document is guidance only and subject to modification as new information on sage-grouse science or mitigation policies emerge. As subject-specific mitigation guidance related to sage-grouse is developed, it may to be appended to this document.

continued on pg 2

mitigation

As used in this document, the term **mitigation** encompasses the full suite of activities to avoid, minimize, and compensate for adverse impacts to sage-grouse and sage-grouse habitat.

Our goals in providing this Framework are twofold:

- Help states, the Bureau of Land Management (BLM), and other partners develop and implement coordinated and robust mitigation processes across the range to reduce threats and the potential need to list the species under the ESA; and
- If the sage-grouse should be listed, application of these recommendations will improve permitting processes, Section 7 consultations, mitigation outcomes, and contribute to sage-grouse recovery.

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[1] http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/COT/COT-Report-with-Dear-Interested-Reader-Letter.pdf

Document Purpose *(continued)*

The Service recognizes that state wildlife agencies have management expertise, authority, and responsibility for sage-grouse conservation in their respective jurisdictions and that private and public land managers have management expertise and authority for sage-grouse habitat conservation. Coordination among federal, state and local agencies, tribes, and stakeholders in forming landscape-scale strategies that include mitigation processes is vital. Using this Framework as a guide can promote consistency in mitigation programs across the species' range and across agencies while providing for some degree of local flexibility.

- Consistency will better enable stakeholders to implement established mitigation actions that positively affect sage-grouse conservation. Consistency will enable the Service to better assess the intended biological effects of these mitigation efforts at the range-wide scale. It is important that locally-adopted processes support national and regional sage-grouse management goals and result in a reporting process that is sufficiently standardized so that data, threats, and accomplishments can be adequately conveyed.
- The Service believes it is important to maintain flexibility in this Framework to accommodate the many differences in the regulatory, socio-economic, and ecological environments between and within states that influence the efficacy of any tool. Flexibility will also allow for and encourage local innovation as programs are developed and tested.
- Generally, while mitigation programs can be flexible to accommodate social and economic considerations, it is important that program elements are based on sound science and are linked to conservation objectives in a transparent manner. Ultimately, we all must be able to demonstrate that impacts are truly unavoidable, compensatory actions appropriately mitigate residual impacts, and the net effect is a conservation gain to the species.

There is no one right or correct design for a mitigation program. Rather, our hope in providing this guidance is that it will encourage consistency across the range and help our many partners develop mitigation processes that simultaneously conserve sage-grouse while maintaining or enhancing economic opportunities throughout the sage-grouse range. Mitigation processes should be fair, implementable, fully compensatory, and effective for sage-grouse.

RELATIONSHIP TO MITIGATION AND RELATED POLICIES AND GUIDANCE

This Framework draws from a variety of mitigation and related policies and guidance, including the Secretary of the Interior's Order 3330[2] entitled "Improving Mitigation Policies and Practices of the Department of the Interior" (October 31, 2013) and the Department of Interior's mitigation report (April 2014).[3] This Framework is consistent with these recent Departmental statements regarding mitigation.

As appropriate, this Framework also draws from the Service's 1981 Mitigation Policy and 2003 conservation banking guidance. However, these Service policies do not specifically cover mitigation for non-listed species, such as the greater sage-grouse. In addition, the scope and terminology of mitigation approaches has grown since these policies were adopted. As a result, the Service is currently in the process of revising its 1981 Mitigation Policy and establishing a new ESA Compensatory Mitigation Policy that will replace the 2003 conservation banking guidance and provide operational detail lacking in current guidance.

These efforts align agency mitigation policies with the Department's recent statements regarding mitigation and current mitigation principles. This Framework reflects accepted principles and standards in the current mitigation realm and principles of the DOI Report, which will in turn form the basis for near future Service-wide mitigation policies. As new Service policy or guidance relevant to this Framework is released, the Service will consider amending this Framework.

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[2] http://www.doi.gov/news/upload/Secretarial-Order-Mitigation.pdf
[3] http://www.doi.gov/news/upload/Mitigation-Report-to-the-Secretary_FINAL_04_08_14.pdf

VERSION 1.0 NOTE

In July 2014, the Service released a draft policy for Voluntary Prelisting Conservation Efforts. There are similarities and differences between the proposed policy and this Framework. Central to both efforts is incentivizing landowners, states, and federal partners to conserve at-risk species by recognizing that actions taken prior to listing can be counted as potential mitigation for future impacts, should a species be listed. The draft policy proposes the program be state-administered and only cover actions that are truly voluntary and not required by a federal, state, or local regulatory mechanism.

The principles and standards in this Framework are applicable to both voluntary and regulatory programs. However, through the Framework the Service encourages any stakeholder, including our federal partners, to develop robust mitigation programs under their applicable regulatory mechanisms and authorities.

Specific to Candidate Conservation Agreement with Assurances (CCAAs), both the Framework and the proposed policy accept that conservation actions above those commitments agreed to in a CCAA may be applied as mitigation. This Framework provides additional sideboards regarding how mitigation actions may be implemented on land enrolled in a CCAA.

The Service encourages our partners to provide feedback on the proposed policy during the public review period.

PART I

Mitigation Program Goals & General Considerations

Mitigation Program Goals

As described above, the Service expects mitigation approaches across the range to be flexible and innovative in how unavoidable impacts from development are mitigated. However, we recommend that all mitigation programs strive for the following goals and incorporate the principles and standards outlined in this document to increase likelihood of contributing to successful sage-grouse conservation.

1. **Achieve net positive conservation.** Mitigation programs should be strategically designed to result in net overall positive outcomes for sage-grouse. This is accomplished by employing avoidance, minimization, and *compensatory mitigation* actions that are based on accepted mitigation principles and standards, use best available science for sage-grouse conservation, and address population-level threats within landscape-level plans. Programs that are structured with a goal of only *no net loss* will be evaluated more conservatively by the Service because they are unlikely to positively influence the conservation status of the species.

2. **Don't reinvent the wheel, integrate existing processes.** To the extent practical and where national management and reporting goals are supported, the program should integrate existing regional, state, and local-level processes as the authorizing, implementing, and enforcement tools for a mitigation program. Partnerships should result in mitigation implementation strategies that prevent fragmented landscapes, restore core areas, and provide connectivity necessary to sustain sage-grouse populations regardless of land ownership or jurisdictional borders.

3. **Make sage-grouse an asset, not a liability.** The mitigation program should provide economic incentives for private landowners and industry to conserve and restore sage-grouse and its habitat. The program should allow for well-sited, well-designed, and appropriately mitigated actions to move forward smoothly and quickly.

4. **Be consistent and fair.** Structure mitigation programs to apply the mitigation hierarchy (avoidance, then minimization, followed by compensatory mitigation) consistently across anthropogenic activities that impact sagegrouse including energy, infrastructure development, land conversion, ex-urban development, mining, and others as appropriate.

Generally, a mitigation program for sage-grouse should address how impacts will be avoided and how a *net conservation gain* will be achieved by compensatory mitigation for unavoidable impacts to sage-grouse across all habitats. Before developing a mitigation program, the Service recommends first considering the types of development activities that will be covered, how avoidance will be assessed, the regulatory mechanisms that relate to those activities, and if regulatory predictability within the context of the ESA is desired. Each of these topics will be covered in this section. See Appendix 2 for specific questions to consider.

Covered Activities

A robust mitigation program will clearly identify the development activities and the associated direct and indirect impacts that may negatively affect sage-grouse; the avoidance, minimization, and compensatory mitigation standards for addressing those impacts; and the consequences of mitigation failure.

While generally some impacts will be universal to each development activity, the actual impacts from such activities will be determined by site-specific parameters (e.g. landscape level values, habitat type impacted, and proximity to leks). Mitigation processes should provide proponents the ability to incorporate mitigation objectives into the design of projects.

At a minimum, mitigation programs should cover anthropogenic development actions that:

- Negatively impact sage-grouse habitat, especially those identified as threats in the COT Report;
- Create spatially discreet, measurable impacts; and
- Are implemented, funded, or permitted by federal, state, or local agencies.

The mitigation program should describe the impact assessment methodology that will be used to measure a development activity's remaining and unavoidable direct and indirect effects to sage-grouse over the life of a development and its impacts, and quantify the potential direct and indirect impacts that likely accrue from each of the specific development types.

The COT Report describes the types of developments that cause the greatest direct and indirect impacts to sage-grouse and provides initial guidance on impact avoidance, minimization, and to a lesser extent compensatory mitigation for these development activities. It can be used as a starting point to further refine and identify local impacts to be considered in a mitigation program.

Activities such as irregular off-road recreational vehicle use or over-grazing may be difficult to both measure and address in mitigation programs due to the diffuse nature of these impacts.

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Avoidance & Minimization

The Service strongly recommends avoidance of direct and indirect impacts to sage grouse habitat, especially in PACs and other habitats identified as important (*see* COT Report). Compensatory mitigation should only be considered if efforts to avoid and minimize the direct effects, indirect effects, and cumulative impacts (each as defined in 40 CFR §§1500-1508) of a development project have been exhausted or are not possible.

Direct effects are caused by an action and occur at the same time and place. Indirect effects are those that are caused by or will result from an action and are later in time or farther removed in distance, but are still reasonably foreseeable. The result is an affect to some aspect of the species' ecology which diminishes the species' ability to shelter, feed, or breed. For example, tall anthropogenic structures can cause avoidance behavior of sage-grouse to leks and brood rearing areas well beyond their direct development footprints.

Cumulative impacts result from the incremental or synergistic impact of an action when added to other past, present, and reasonable foreseeable future actions. For example, outside of its direct footprint a development may, over time, result in a loss of suitability of surrounding habitat through isolation, increased noise levels, acceleration of invasive species colonization, degraded water quality inputs, or other factors.

Avoidance mechanisms can include moving a project, the use of exclusion areas, and caps on habitat disturbance to prevent negative impacts. True avoidance is only achieved when sage-grouse and/or their habitat have no exposure to the activities associated with the action or the activities will have no effect on sage-grouse behavior or habitat use over time.

Minimization mechanisms can include, for example, timing stipulations for noise or other activities which may disturb sage-grouse, removing water sources to reduce exposure to West Nile virus, limiting activities or practices that may result in wildfires, best management practices for construction projects to prevent invasive plant issues, predator attractant management, co-location or burying of necessary support utilities, and/or marking fences to minimize direct mortality of birds. Most minimization actions will still have temporary (e.g. construction-related) or residual effects (e.g. reducing noise may not eliminate all effects) that should be accounted for, avoided, and if unavoidable then offset through compensatory actions.

By fully avoiding impacts up front, there is no need to take additional mitigation hierarchy steps. Compensatory mitigation should only occur when disturbances are proven unavoidable, minimization does not provide for complete direct or indirect impact avoidance, or avoidance and minimization cannot achieve the best possible conservation outcome for the species. For the purposes of this document, we borrow from general mitigation banking terminology and refer to any impact as a *debit* and any compensatory mitigation action as a *credit*.

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Regulatory Mechanism

The combination of increased development and the inadequacy of regulatory mechanisms in requiring proposed development to avoid impacts is a pressing issue for sage-grouse conservation. Even in areas where the primary threat is not development, providing adequate regulatory mechanisms to address anthropogenic impacts and other threats is necessary to ensure long-term protection of the species.

States hold the primary responsibilities for the management of sage-grouse, while federal agencies manage almost two-thirds of the species' habitat. The Service recommends clearly identifying the federal, state, local and tribal regulatory mechanisms for siting and permitting each major development type that impacts sage-grouse. It is important to note if environmental review is triggered for each development type and how that review may result in avoidance, minimization, and offset requirements. A lack of clear regulatory incentives to follow the mitigation hierarchy will decrease the Service's ability to assess the long-term likelihood of successful implementation.

Regulatory Predictability and ESA

While mitigation programs should be designed first with an eye towards conserving sage-grouse, and thus be able to function outside the ESA, users and suppliers of compensatory mitigation may still wish to know from the Service that any mitigation actions produced in advance of a potential listing will count in a post-listing scenario.

A program that utilizes *prelisting mitigation* credits could provide a major incentive to get conservation on the ground now and may also be a market driver for mitigation programs. In this guidance, prelisting mitigation refers to explicit recognition from the Service that actions or credits developed or acquired both in advance of impacts, and in advance of a listing decision, will be considered as a conservation action in a status review. These credits may be used as compensatory mitigation through ESA consultations should the species be listed, in which case the status review will evaluate the net effect of the actions or credits produced. Additionally, suppliers of compensatory mitigation may be able to attain regulatory predictability that, should the species become federally listed, the management to which they agreed will not change and/or incidental take coverage will be provided for these management actions.

Programs with prelisting mitigation options that wish to have these credits treated as measures to minimize and mitigate the impact of incidental take, should sage-grouse be listed, will need to enter into a prelisting mitigation agreement with the Service.

Securing mitigation prior to project development should not act as a substitute for avoiding and minimizing impacts. Developers should design their projects to avoid and minimize direct, indirect, and cumulative biological impacts regardless of whether compensatory mitigation credits have already been acquired.

If sage-grouse is listed, robust mitigation programs endorsed by the Service and implemented prior to the listing decision can provide benefits to participants and sage-grouse alike. Most importantly, such programs will more likely be designed to contribute to recovery. In addition, if the species is listed as threatened, the Service may propose a special rule under section 4(d) of the ESA to allow for take incidental to activities conducted pursuant to an adequate local mitigation program. The Service will work closely with interested states or other stakeholders to provide greater regulatory predictability, to the extent possible, for these advanced implemented mitigation actions.

PART II
Principles, Standards & Mitigation Program Elements

Principles of Mitigation

Any mitigation program for sage-grouse which includes compensatory mitigation is best developed consistent with the goals outlined in the beginning of this document and with the following principles, which are meant to provide clarity and guidance in cases where the Framework is silent or unclear:

- **Observe an appropriate mitigation sequence:** Compensatory mitigation is only considered after all avoidance and minimization measures have been explored. Avoidance is the most desirable approach to preventing impacts to sage-grouse from development.

- **Attain net conservation gain:** Overall outcomes must result in no net loss to the species at the population or landscape-scale. To achieve this and improve overall conservation status, programs should be structured to attain a net conservation gain.

- **Use a landscape-scale approach to inform mitigation:** Develop mitigation programs in conjunction with, or guided by, a landscape-level conservation plan. Cross-jurisdictional partnerships are better positioned to design mitigation strategies that will prevent fragmented landscapes and restore core areas and connectivity necessary to sustain the sage-grouse.

- **Ensure transparency, consistency, and participation:** Use timely and transparent processes that provide predictability and uniformity through the consistent application of standards, protocols, and metrics developed to achieve effective mitigation. Appropriate and effective stakeholder participation in mitigation recommendations and decisions should be facilitated.

- **Base mitigation decisions in science:** Use the best available science in formulating mitigation recommendations and decisions, consistent with all applicable policy.

Standards of Mitigation

Approaches to compensatory mitigation that follow these principles and adhere to the standards below are expected to achieve the best outcomes for conservation through effective management of the risks associated with compensatory mitigation. Application of equivalent standards across all compensatory mitigation sources will better ensure conservation goals are met.

- **Siting:** The mitigation sequencing hierarchy should be applied in the context of conservation objectives derived by a landscape-scale approach. Compensatory mitigation actions should be sited in locations that have been identified in conservation plans to most likely successfully and fully compensate losses to sage-grouse.

- **Duration:** Compensatory mitigation actions should achieve targeted biological conditions in a timeframe commensurate and proportional with the biological impacts to be offset.

- **Additionality:** Actions proposed as compensatory mitigation should provide benefits beyond those that would be achieved if the mitigation actions had not taken place and should exceed what is otherwise required by federal, state, and local regulations.

- **Effectiveness:** Compensatory mitigation actions should be proven to be reasonably likely to deliver expected conservation benefits, target those actions that will provide the greatest benefit to sage-grouse, and be measurable.

- **Durability:** Actions or plans proposed as compensatory mitigation must be accompanied by management, legal, and financial assurances that ensure the action or plan will be in place and effective for the intended duration. Assurances should address the unintentional loss as well as the intentional loss of a compensatory mitigation action.

- **Metrics:** Determinations of the expected impacts of actions and the measures necessary to avoid, minimize, or compensate for those impacts should be based on biological conditions and upon reliable, repeatable, and quantitative science-based methods.

Mitigation Program Elements

With these principles and standards in mind, the following discussion provides specific information to consider when developing a compensatory mitigation program.

With sage-grouse it is important that the program's rules governing *additionality*, *effectiveness*, and *durability* are designed in a way that is equitable between public and private lands and can address potential issues with properties of *split estate* ownership.

The information provided below, plus the list of detailed questions in Appendix 2, are designed to help entities develop thoughtful and robust mitigation programs and processes in the context of the full mitigation hierarchy.

1. PROGRAM GOVERNANCE

The Service encourages our state and federal partners to integrate mitigation planning into a broader ecological landscape context, which means moving toward a programmatic approach. Whether mitigation requirements occur through a local (e.g. county) permit process or a larger state- or regionally-administered program covering many permitting agencies, a mitigation program requires a broad array of elements and functions to operate.

Program goals, covered activities, requirements, and administrative roles should be clearly defined. The program should address how the mitigation hierarchy will be implemented, account for avoidance, and clearly establish when and why impacts are deemed unavoidable. To improve operational certainty in compensatory mitigation, programs should clarify up front the manner in which mitigation obligations will be quantified, the types of actions that will qualify as mitigation, and the consequences of mitigation failure. Because sage-grouse is a landscape-scale species, a process for coordinating mitigation programs both intra- and inter-state should be outlined within programs.

1a. Mitigation Program Types

Traditional compensatory mitigation mechanisms include *permittee responsible mitigation*, *conservation banks*, *in-lieu fee*, and other third party mitigation programs (e.g. *habitat credit trading systems* or *habitat credit exchanges*). The mitigation mechanisms differ by who is ultimately responsible for the success of the mitigation site (the permittee or a third party) and when mitigation actions occur relative to impacts.

The Service prefers mitigation programs that promote compensatory mitigation achieved prior to impacts, aggregate mitigation as part of a larger landscape approach, and provide long term protection and management of mitigation sites. Regardless of the type of mitigation mechanism utilized, mitigation actions or types should be held to equivalent standards for siting, duration, additionality, effectiveness, and durability and utilize consistent metrics.

CONSERVATION BANKING

The Service has a proven track record with conservation banking agreements and such agreements represent a familiar and durable type of mitigation program. While some deviations may be needed to develop a commercially viable and biologically relevant sage-grouse compensatory mitigation program, the closer the requirements of a compensatory mitigation program track those of conservation banking, the more likely the program is to provide certainty of implementation and effectiveness in improving the status of the species.

1. PROGRAM GOVERNANCE *(continued)*

1b. Program Administration

The *program administrator* will be the entity with enforcing authority for the establishment, operation, and management of a mitigation program. The administrator or their designee(s) must have the ability to enforce management actions, reconcile funding issues, incorporate adaptive management, track debits and credits, report results, etc.

The degree of authority granted to the administrator ensures that conservation benefits from compensatory mitigation will persist.

Since successful habitat conservation will require coordination across federal, state, tribal, and private interests, the program administrator should be recognized through a formal agreement developed with major stakeholders including federal, state, and tribal partners. The agreement should clearly articulate the selection process for any third party responsible for administration of various elements of the program.

The entity handling monetary funds must have the ability to separately manage, collect, and distribute funds.

Prior to collection of any funds, plans should be in place that explain the maximum time funds can be held before spent, how funds will be invested (including inflation protection), tracking and accounting for benefits generated by funds, guidelines for avoiding potential conflicts of interest between collecting and spending funds, and responsibility for performance of mitigation projects.

1c. Compliance and Enforcement

Compliance can be monitored several ways, including through a credit verification process, tracking system, and review of periodic monitoring reports. Processes to verify that mitigation actions meet program standards and are releasable for offsetting impacts provide assurance that compensatory mitigation sites are delivering benefits. A system to track both debits and credits is essential in ensuring compliance, increasing transparency, and allowing the administrator to determine the success of mitigation efforts in achieving conservation.

Monitoring reports at both the program and site level should be required at least annually. Monitoring should be structured to provide feedback on which compensation projects and actions successfully yield intended results and which have a higher likelihood of failure. Site-level reports should document site conditions, attainment of administrative and ecological *performance standards* (measurable attributes used to determine if the management plan meets the agreed upon goals and objectives), and management actions taken and expected to be taken in the future.

Enforcement structure and procedures should be developed at the program level. At the site level, agreements should include clear enforcement provisions that dictate the consequences of non-compliance, including a requirement that if the compensation fails to meet performance standards, the mitigation provider should provide equal compensation through other means. If the agreement holder does not satisfy the mitigation requirements, the regulating entity should have the ability to suspend or terminate credit releases, credit sales, or the agreement itself and pursue penalties for violations as appropriate.

1d. Role of the Service

The exact nature of the Service's involvement in any given mitigation program will vary and may include the following roles:

- Provide ongoing expertise and advice to state mitigation programs and state wildlife agencies as requested;
- Participate as a member of the BLM "WAFWA (Western Association of Fish and Wildlife Agencies) Management Zone Greater Sage-Grouse Conservation Team" or similar regional teams;
- Provide, as necessary, any conferencing or consultations which may result from mitigation projects or programs on federal lands;
- Accept and evaluate annual reports from mitigation programs, including evaluation of the effectiveness of any mitigation performed in relation to both sage-grouse and mitigation program functionality monitoring;
- Review and consider for approval or endorsement programs that seek to provide prelisting mitigation credits.

1e. Confidentiality

The Service recognizes that some participants in mitigation programs, especially private land compensatory mitigation providers, may be concerned about the potential for public disclosure of information through local, state, or federal rules. We recommend that any mitigation program provide for a transparent process by which the actions and effectiveness of the entire mitigation program can be evaluated, and that individual agreement holders be made aware of any potential for information to be publicly disclosed by participation in these programs.

2. DEVELOPING SERVICE AREAS

Identifying geographic areas where compensatory mitigation can best be located and successfully implemented is critical to ensuring that unavoidable impacts are adequately offset. In traditional mitigation terms this is known as a *service area*, the geographic area within which credits may be applied to offset debits associated with development activities. Service areas are mapped geographies with unique ecological and sometimes political significance. In general, larger service areas provide greater flexibility to exchange credits and debits. Landscape, economic, and regulatory realities inform and constrain decisions on service areas.

The geographic extent of a service area should be guided by the conservation needs of sage-grouse. Populations are identified in the COT Report. This is a recommended starting point. The location of the COT PACs, other key habitats defined in local plans, and the current and potential for future threats to a population should factor strongly into the designation and size of service areas. For larger populations, PACs may be a more appropriate scale for service areas so that PACs are kept as strongholds. For small populations, offsets may be most appropriately kept within that population. For small or large populations with positive population trends, offsets may be best directed at connecting habitat. If a particular area is under heavy development pressure, it may be best to focus offsets on an area removed from possible cumulative effects of those impacts. Service areas should reflect these more local population-based conservation needs.

To meet conservation goals and provide flexibility in mitigation programs, secondary service areas may be devised. A secondary service area is a larger area within which mitigation would be acceptable if more preferable options in the primary service area do not exist. Typically, a proximity factor (i.e. additional mitigation in the form of a multiplier or increased *mitigation ratio*) is added to mitigation going outside the primary service area. These tools can provide for flexibility of trades between service areas while encouraging offsets to stay within certain areas.

Jurisdictional issues should also be considered when developing service areas. Many large-scale development projects cross state and county boundaries. Service areas that span such political boundaries, though they have little to no biological or ecological significance, can provide efficiencies and greater conservation benefits for sage-grouse.

Service areas should be defined early in the development of a compensatory mitigation program in collaboration with all land ownerships and management agencies. The service area is an important component for third-party mitigation providers, who need to evaluate the marketability of their credits. An appropriate mix of public and private lands for compensatory mitigation is essential to implement a landscape approach to mitigation of habitat that is so widely distributed and intermixed. If Service areas are delineated primarily on the basis of jurisdictional or policy considerations, they should be well-justified in terms of their benefits to sage-grouse.

3. SITE SELECTION, CONSERVATION ACTIONS AND MANAGEMENT

Compensatory mitigation may be established on private, public, or tribal lands with the first criteria that specific areas provide the greatest benefit and reduce the greatest threats to sage-grouse. Priority areas in which to place mitigation actions should be biologically based and will be integrated among private and public land ownerships. However, maintaining the same classification of land ownership between the impact and mitigation site (e.g. mitigating impacts to private land on other private land) may be important in preventing a long-term net loss in conservation to sage-grouse.

A mitigation program should require that all lands being used for compensatory mitigation comply with program goals and objectives for managing habitat for the continued use of sage-grouse for at least the life of the impacts that the mitigation actions intended to offset.

Minimum requirements for establishment and operation of mitigation areas include:

- A site-level mitigation agreement which defines the roles and responsibilities of the mitigation provider, the agencies, and any other parties, and provides an operational framework for development, implementation, monitoring, and compliance of the project;
- Real estate assurances that will protect the mitigation area for the designated duration, including restriction of incompatible uses;
- Financial assurances to fund establishment and management of the mitigation area for the designated duration; and
- A management plan that will provide for the habitat management, monitoring, and continued adaptive management of the mitigation area.

3. SITE SELECTION, CONSERVATION ACTIONS AND MANAGEMENT *(continued)*

Site-level agreements should include a description of the amount of mitigation (or credits) to be provided, including a brief explanation of the metric used for this determination, and a process for adaptive management that will address uncertainties, including new information and unforeseen or unregulated situations (e.g. weather, fire). Each agreement should identify discrete ecological and administrative performance standards to be met and possible contingencies and consequences for not meeting standards. Monitoring should be designed to validate the effectiveness of the mitigation, answer program questions, contribute to knowledge gaps, and provide data to inform adaptive management decisions.

Compensatory mitigation should target projects in areas providing the greatest benefit and reducing the greatest threats to sage-grouse given jurisdictional and other constraints. States and federal land management agencies have already undertaken considerable efforts to identify and map key habitats necessary to maintain redundant, representative, and resilient populations in the development of their state and federal management plans (i.e. PACs). Additional finer-scale planning efforts by states or federal land management agencies may be necessary to determine if other essential habitats exist, particularly for connectivity, range or population expansion, and flexibility in managing habitat changes that may result from climate change.

Site selection criteria should outline the types of sites that are ecologically suitable for providing the desired habitat conditions and functions. In determining the ecological suitability of the project site, the following factors should be considered, to the extent practicable:

- Physical characteristics of the site;
- Landscape-scale features such as habitat diversity, function, and connectivity;
- Juxtaposition of the compensatory mitigation site relative to other areas of suitable habitat and ecological features;
- Ecological and legal compatibility with adjacent land uses;
- Compatibility with existing conservation plans and assessments;
- Development trends;
- Anticipated land use changes;
- Habitat status and trends;
- The relative locations of the impact and compensation sites; and
- Local or regional goals for the protection or restoration of particular habitat types or functions.

It is essential that efforts to offset unavoidable impacts through compensatory mitigation target the highest priority conservation actions for a population (or at the PAC scale for larger populations) to be effective. The Service recommends following the broadly-identified project types and conservation measures identified in the COT Report, based on local conditions and threats. Measurement of outcomes should be achieved using standard methods that link to sage-grouse population size to improve consistency and efficiencies and demonstrate that actions provide the necessary level of conservation benefit.

At a site-level scale, the mitigation actions taken on a given site should measurably offset impacts (from another site) and programmatically provide a net benefit to sage-grouse at the population or PAC (for larger populations) scale. For example, marking fence line and removing invasive juniper may not adequately offset permanent, limiting-factor, habitat impacts. However, these actions, in combination with other actions, such as permanent protection and active management, may collectively provide a net benefit. Research and education, although very important to the conservation of sage-grouse, should not be considered for compensatory mitigation as they are not actions that replace actual impacts to the species.

4. ADDRESSING ADDITIONALITY

Actions proposed as compensatory mitigation, regardless of land ownership, should provide benefits additional to those that would be achieved if the mitigation actions had not taken place. The additional value may result from conservation benefits to sage-grouse associated with *restoration* or *enhancement* of habitat; management actions that protect, maintain or create habitat (e.g., fire protection measures, legal and financial site protections); other activities (e.g., reduction of threats from disease or predation); and most likely a combination of all three categories.

4a. Program and Regulatory Considerations

To achieve additionality, compensatory actions must comply with all applicable federal, state, and local laws and exceed all existing regulatory or policy obligations associated with the project site. Lands already designated for conservation purposes cannot be used as compensatory mitigation unless the proposed compensatory mitigation project would add additional conservation benefit above and beyond that attainable under the existing land designation. This includes public lands dedicated for conservation purposes; private lands enrolled in government programs that compensate landowners who permanently protect, restore, or create habitat for sage-grouse; or lands protected by a habitat management agreement with the Service or similar programs.

For example, because the Service is mission-committed to species conservation, compensatory mitigation on National Wildlife Refuges is unlikely to be considered additional. However, additionality may be possible on a BLM Area of Critical Environmental Concern (ACEC) if, for example, existing mineral rights are resolved in some manner, thus providing additionality by avoidance of future loss of sage-grouse habitat from the rights being executed. Private lands enrolled in short term sage-grouse related conservation agreements with public entities, such as the Service's Partners for Fish and Wildlife Program or USDA Natural Resources Conservation Service Sage Grouse Initiative (SGI), may be eligible as mitigation lands if additional conservation benefits are provided above and beyond the terms and conditions of the agreement.

4b. Public Funds

Except for projects where federal funding is specifically authorized to provide compensatory mitigation, federally-funded conservation projects undertaken for purposes other than mitigation will not be considered additional. However, compensatory mitigation credits may be generated by activities undertaken in conjunction with, but supplemental to, such programs in order to maximize the overall ecological benefits of the restoration or conservation project (e.g. SGI). Where federal funds have been used in the establishment of a mitigation area, the allocation of credits should be proportionate to the non-federal contribution. If SGI funds are used to fund sagebrush restoration for sage-grouse, a landowner may participate in a compensatory mitigation program once the financial term of the SGI conservation plan contract expires. However, as specified by the agency administering the program or the Service, these properties may not qualify for full mitigation credit compared to a property that was not enrolled in such a program.

4c. Ecological Considerations

Credit *stacking* occurs when there is more than one resource or credit type on spatially overlapping areas. Stacking of mitigation credits within a mitigation site is possible, but the stacked credits should not be used to provide mitigation for more than one environmental impact action. However, compensatory mitigation projects may be designed to holistically address requirements under multiple programs and authorities for the same action and may use stacked credits to accomplish this goal. For example, a single credit may satisfy compensatory mitigation needs of an impact site where habitat for mule deer and sage-grouse overlap. The processes for use and accounting of stacked credits should be transparent across the entities that regulate the credits.

To ensure ecological benefits are measurably additional, programs should identify when or if it is appropriate to trade impacts to one form of sage-grouse habitat for offsets to another form. For sage-grouse, while *in kind* mitigation for habitat types (e.g. an impact to nesting habitat offset with restoration of nesting habitat functions and values) is preferred, *out of kind* compensatory mitigation for sage-grouse habitat may be appropriate where priority recovery needs can be addressed (e.g. loss of wintering habitat may be offset with brood rearing habitat in areas where the latter is a limiting factor).

4. ADDRESSING ADDITIONALITY *(continued)*

4d. Baselines

In order to determine ecological uplift (for mitigation sites) and potential impacts (for development sites), pre-project *baselines* must be assessed. Pre-project baseline refers to the habitat and/or species population conditions at any given point in time against which conservation actions are measured to determine ecological gain or loss. Baseline conditions should be assessed and measured using the same methodology employed to predict future conditions during project planning stages and ultimately to verify project conditions and associated credits during periodic and final monitoring of mitigation sites. The Service strongly recommends that a consistent methodology also be applied to predict impacts to sage-grouse and sage-grouse habitat (*see* Determining Metrics). For mitigation sites, baseline measures should explicitly acknowledge the potential threat of anthropogenic and natural disturbance, as well as the overall landscape resiliency of the site. Baseline methods should be consistently employed across the area covered by the mitigation program, unless variation of conditions and available data justify differences.

The Service has not developed or endorsed any one specific methodology for determining baseline conditions. States and other management entities may find it useful to cooperatively develop, adapt, adopt, or align methods that can be consistently applied across larger landscapes. The methods that will be used for measuring these types of baselines should be determined as part of early mitigation program development. Consider including information about scale (e.g. plan-level, state level), vegetation base layers, existing disturbance layers, lek data, sage-grouse occupied habitat, etc.

4e. Candidate Conservation Agreements

Landowners enrolled in *Candidate Conservation Agreements* (CCAs) or *Candidate Conservation Agreement with Assurances* (CCAAs) can provide compensatory mitigation if the actions related to mitigation are additional to the minimum conservation measures required by the CCA/CCAA. In order to track conservation actions and ensure additionality, conservation measures and mitigation-related conservation actions should be independently accounted for and reported to each respective program. Actions managed in perpetuity through mitigation agreements would provide both additionality and durability to the conservation measures provided under often shorter term candidate agreements. The ability to fund additional conservation on individual CCA/CCAA properties through mitigation dollars could further guarantee implementation of positive conservation actions. By keeping open the ability for those in CCA/CCAAs to market their additional conservation uplift to others needing to offset unavoidable impacts, more landowners will be encouraged to enroll in candidate agreements now.

Providing a menu of conservation options for landowners and reducing risk and uncertainty in conservation actions by securing them under mitigation agreements may contribute to an overall positive conservation goal for a species that operates on a landscape scale and for which protection and management of existing habitat is key to its survival.

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5. DEMONSTRATING EFFECTIVENESS & DURABILITY

Effectiveness may be compromised when the benefits of compensatory mitigation either do not come to fruition or do not persist for the full duration that is required based on the impact that is intended to be offset. Effective actions or plans proposed as compensatory mitigation will demonstrate timeliness (i.e. achieve targeted biological conditions in a timeframe that benefits sage-grouse), biological effectiveness (i.e. ecological durability), and will be accompanied by durable site protections and financial assurances that secure and protect the conservation status of the mitigation site and credits for at least as long as associated impacts persist. In order to ensure that obligations for compensatory mitigation are durable, when a project requires compensatory mitigation, the regulating entity should include the compensatory mitigation requirement as one of the conditions in the project's permit or other required authorization.

5a. Duration

The length of time compensatory mitigation actions persist on and influence the landscape should meet or exceed the length of time that projected impacts will negatively affect sage-grouse. Duration includes the time extent of the direct, indirect, and cumulative effects of an impact as well as the time period for an impact site to be fully restored.

Because most impacts typically begin to occur in the early stages of projects (i.e., construction and initial operations), benefits of proposed mitigation actions should accrue before or as early in the life of the project as possible. When the success of compensatory mitigation is demonstrated prior to impacts occurring, ecological risk (due to uncertainty of implementation and time lag) is reduced. These benefits should be verified via standardized monitoring.

On the impact side, the effect to a species may vary widely based on the size, location, quality of habitat affected, temporal nature of the impact, and other factors. Impacts to the species may be generally separated into short term and permanent impacts. Short term impacts have a known conclusion date whereby the adverse effects to the species are removed and the result of the impact to the species has been completely remediated through natural or active restorative processes. Short term impacts should be predictable, justified by the current knowledge of the species and its habitat, and be concluded by documentation of the habitat functioning for the species at the same or greater level than before the impact.

Short term impacts are often mitigated through permanent compensation actions, either at the same or a reduced amount of permanent impacts (e.g. a short term impact may require 1 permanent credit as offset where the same impact that is permanent may require 5 credits to fully compensate). This is preferable to limited-term credits given the economies of scale gained from the longer term management and protections of permanent mitigation sites. Potential scenarios where limited-term credits may effectively be used as an offset include: 1) applying higher ratios for limited-term credits; 2) limiting use of limited-term credits within a service area or program to a small percentage of total credits available; 3) use of limited-term credits on restored habitats instead of preserved areas to reduce risk of net loss of intact existing habitat; 4) setting the duration of the offset to include the restoration period of the impacted site plus additional time to recover lost productivity; and 5) using only a portion of limited-term credits in a given area and permanently retiring the rest to address risk and uncertainty. In any situation, the rationale for development of temporary compensation should be biologically justified.

5b. Biological Effectiveness

Compensatory mitigation actions must have a high likelihood of success based on the biophysical setting. Actions should be supported by sound science. Actions that are unproven, especially those where time lags in providing conservation benefits are not adequately addressed, should not be prioritized for compensatory mitigation. However, such unproven actions can be encouraged without causing significant environmental risk by allowing a portion of credit to be released for implementation of actions, and holding back the majority of credit until defined and observable performance criteria related to habitat quality are achieved (*see* Credit Release).

Conservation actions are also more likely to be meaningful if they are aggregated. Compensatory mitigation areas are most effective if they are large enough so that they will, either in themselves or in conjunction with adjacent landscape conditions, provide the targeted biological benefits long term. Compensatory mitigation is not effective if it occurs in areas impacted by a development project (i.e. on-site), where future development is likely to occur, or in areas where benefits are likely to be reduced over time by incompatible land-uses and surrounding landscape edge effects. Applying credits from one area to multiple debit sources may provide more concentrated landscape level conservation benefits.

continued on pg 16

5. DEMONSTRATING EFFECTIVENESS & DURABILITY *(continued)*

5b. Biological Effectiveness *(continued)*

Potential credit associated with proposed restoration and enhancement activities should be evaluated on a given site in comparison with both pre-project baseline and projected future condition that would be expected in the absence of the proposed mitigation activity. *Preservation* projects should be evaluated, and credits proportionately assigned, according to the magnitude and likelihood of existing and future threats to the habitat and/or the value of that site to conservation of the species. Crediting for such avoided loss may be acceptable if it reduces primary threats, is discounted according to the likelihood of loss, and includes actions above and beyond closure to development (e.g. permanent conservation easement).

Preservation projects can help maintain the integrity of PACs, a key conservation objective in the COT Report.

5c. Durability — Site Protection

An ecologically sound compensatory mitigation plan offers limited value if the area may be affected by future disturbance. Durability can be reached with site protections (e.g., real estate-related designations and management plans) and financial protections (e.g., bonding for construction, endowment for management). The Service recognizes that durability is a relative concept and that certain land protection designations are more subject to modifications over time than others, therefore it is important that compensatory mitigation programs clearly define how durability will be addressed across various land ownership types.

A site protection (or real estate) instrument or agreement is a written description of the legal arrangements including ownership, management, and enforcement of any restrictions that will be used to ensure the protection of a compensatory mitigation site, whether the mitigation is placed on federal or nonfederal lands. Instruments most commonly used for this purpose include conservation easements, deed restrictions, transfer of title, multiparty agreements, contractual documents such as conservation land use agreements, and regulatory mechanisms governing management of federal lands such as federal land management plans. Where possible, a site protection instrument should designate an appropriate third party the right and resources to enforce site protections.

Lands with split estate ownership and laws and policies governing existing rights (e.g. mining laws) may prevent a particular site from meeting the durability test when durable land protection instruments (e.g. permanent conservation easements) cannot be applied. The Service recommends that the risk of using split estate properties be carefully considered in siting compensatory mitigation. Layering several site protection tools or using risk management tools such as pooled *reserve accounts* and *retired credits* can be used to bolster durability (*see* Reversals).

Written into any instrument or agreement and identified in the administrative and regulatory documents (e.g. Records of Decision) that enable the original mitigation should be provisions for alternative adequate mitigation if subsequent changes in management direction result in incompatible uses on the land. Site protection instruments should also have written agreement that provides for alternative and adequate mitigation should the site fail.

For any site protection instrument, the following information should be included:

1. Express reference to the mitigation program and its purpose to protect a compensatory mitigation site under federal, state, and/or local law;
2. Survey/legal description and identification of other property rights or interests;
3. Baseline description of conservation resources on the site, including any state or federally listed or imperiled species;
4. Third-party right of enforcement by the regulating agency (preferable);
5. Amendment and transfer notification requirements;
6. Any prohibited and acceptable uses;
7. Subordination clause requiring any preexisting easement, liens, or encumbrances to take second priority to the use of the property as a compensatory mitigation site; and
8. Any information required by applicable state or other laws (e.g., conservation easements).

5. DEMONSTRATING EFFECTIVENESS & DURABILITY *(continued)*

5d. Durability — Financial Protections

The mitigation program should require sufficient financial assurances connected to each compensatory mitigation project to ensure a high level of confidence that the compensatory mitigation will be successfully completed in accordance with applicable performance standards and for the full duration of the project's intended life. To demonstrate stability, adequate funding sources to provide for interim and long-term operation, management, monitoring, enforcement, documentation costs, and contingencies or remediation (if the project fails to meet performance standards) should be identified.

The amount of financing to deliver the mitigation is best determined by an appropriate cost-analysis for all elements of the mitigation, including acquisition, easement, restoration or enhancement, and long-term maintenance. Typical cost estimate components include land purchase price; taxes; site protection instrument; project planning; permits; construction activities; restoration materials; as built surveys; operation and maintenance costs; management, monitoring and reporting activities; reasonably foreseeable remedial actions; contingencies; and legal and administrative costs.

Examples of financial assurances include performance bonds, irrevocable trusts, escrow accounts, casualty insurance, letters of credit, endowments, and legislatively enacted dedicated funds for government-operated mitigation sites.

In cases where an alternative mechanism is available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained (e.g. a formal, documented commitment from a government agency or public authority) financial assurances may not be necessary or may be reduced.

For any funding vehicle, proper portfolio management is critical to providing sufficient investment growth to keep pace with inflation. Overall success will be determined by establishing appropriate risk and return objectives, asset allocation guidelines and suitable investments for funding, and a framework for ongoing monitoring of investment performance. All funds should be held in dedicated accounts and managed based on agreed-to terms to assure that target ecological conditions will be attained and maintained as necessary. Public agencies are generally limited in their ability to protect long-term funds for being used for other purposes, thus the Service recommends any mitigation funds should be held by third parties.

Dedicated funds to maintain and monitor the conservation action will ensure transparency and maximize the potential to attain and maintain ecological durability. The Service recommends that the program specify the conditions under which financial assurances are to be released to any party including, as appropriate, linkage to achievement of performance standards, adaptive management, or compliance with special conditions.

6. DETERMINING METRICS & ACCOUNTING SYSTEMS

The methodologies, or metrics, used to determine the expected impacts of actions (debits) and the measures necessary to mitigate those impacts (credits) must be based on biological and/or habitat conditions and upon reliable, consistent, and repeatable methods and analysis resulting in a common "currency" between credits and debits. Ultimately, the metrics used must clearly tie back to species conservation.

A formal, consistent, rigorous but relatively simple methodology[4] to assess impacts should be used and applied to all land development activities that impact sage-grouse. The methodology should address direct impacts (habitat removal), indirect impacts and disturbance, potential significant cumulative effects, and ecological site conditions. Metrics that are comparable or the same across jurisdictional boundaries will allow for more biologically meaningful exchanges in a landscape context. Approaches such as distance-based disturbance bands, habitat weighting, and ecological potential are acceptable, especially in conjunction with defined thresholds of allowable impact in defined geographies.

Verification, monitoring, and adaptive management of metrics are important components of mitigation program accounting necessary to ensure success.

- *Verification* is the process(es) used to confirm that program rules have been followed and provides a standardized process for reporting and monitoring that is needed by agencies that oversee mitigation programs and must certify credits for sale or use. Complete, consistent, and accurate verification provides the public and credit buyers with evidence that the mitigation program is in compliance and delivering benefits.

- Monitoring of actions generating credits ensures practices are implemented and maintained and may be necessary throughout the life of the project, though frequency may vary based on the management needs of specific projects (e.g. restoration projects may require more frequent monitoring than preservation projects).

- To adaptively manage metrics, the program should establish clear thresholds to trigger future adjustments and include criteria and processes for making adjustments in a way that will not undermine existing credits or mitigation agreements.

A robust compensatory mitigation program will provide an accounting system[5] whereby credits and debits can be tracked. Registries developed for other environmental markets which function to issue, transact, and retire serialized credits represent current examples of robust accounting mechanisms. The accounting system should foster transparency, accountability, and credibility and facilitate the connections between compensatory mitigation providers at the lowest transaction costs.

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[4] Refer to *Measuring Up* document submitted to USDA for key considerations when developing robust metrics: http://willamettepartnership.org/measuring-up/Measuring%20Up%20w%20appendices%20final.pdf

[5] See Willamette Partnership's *General Crediting Protocol* for an example of an ecosystem credit accounting system.

7. MANAGING RISK

Predictions about effects and the effectiveness of compensatory mitigation measures carry varying degrees of risk and uncertainty. Programs should target mitigation measures that are expected to achieve a net gain for sage-grouse commensurate with the degree of risk and uncertainty associated with predicted effects. Increasing uncertainty of impacts from climate change means we need new approaches to assess multiple future scenarios, resilience of mitigation plans, to provide for adaptive management, and to ensure risk is properly managed. Overall, reducing uncertainty within a mitigation program increases regulatory predictability. The following risk management tools, in conjunction with site and financial protections, should be considered in a mitigation program.

7a. Adaptive Management

Adaptive management is an iterative approach to decision-making, providing the opportunity to adjust decision in light of learning with an overarching goal of reducing uncertainty over time. Incorporating adaptive management strategies into mitigation area management plans can help to manage risk and uncertainty for any type of mitigation area. Adaptive management processes require establishment of management benchmarks to ensure progress towards goals, protocols to monitor progress related to these benchmarks, and the resources and ability to make adjustments as needed to ensure mitigation objectives are achieved. The adaptive management plan should include triggers for identifying when corrective actions should be taken.

7b. Credit Release

One way to manage risk and uncertainty is by creating release schedules that only allow use of mitigation actions when specific success criteria are met. Success criteria should be designed to identify when risk and uncertainty have been substantially reduced. For third party mitigation sites, the Service recommends providing phased credit releases based on both ecological and administrative performance. A legally binding credit agreement should be in place between any party generating credits and the program administrator. The mitigation agreement should provide a schedule for credit releases as appropriate milestones are achieved. Failure to meet these milestones should result in suspension of credit release to ensure compliance.

Administrative criteria which may allow for initial credit release could include: site agreement and management plan have been approved, the site has been secured with an appropriate real estate instrument, and appropriate financial assurances have been established. Subsequent credits can be released for meeting ecological milestones (as determined through site monitoring) and financial milestones (e.g. endowments partially funded by portions of each credit sale). The credit release schedule should reserve a significant share of the total credits for release only after full achievement of performance standards.

7c. Ratios

Mitigation ratios (trading ratios, multipliers, proximity factors) may be used to address uncertainty or implement policy decisions to ensure net gain. Ratios can enable offset transactions to achieve net benefit for the species by ensuring the credit acquired is functionally greater than the debit.

Ratios may be determined based on several factors including temporal considerations (impact versus mitigation timing), functional quality and importance of proposed impacted areas, projected functional quality of proposed mitigation areas, likelihood of restoration success, degree of threat to proposed preservation areas, durability, etc.

However, we must be cautious in the over-use of ratios to make up for limited understanding of sage-grouse habitat restoration and our inability to accurately measure and compare the value of habitat types. Ratios should be reserved for dealing with the true uncertainty of any mitigation program and also for policy-based incentives (e.g. increasing trading ratios for acquiring credits outside an impact's service area). Any mitigation ratio used must be based on sound biological rationale that is easily explained, readily understood, and consistently applied. Documentation and justification for ratio values is important.

EXAMPLE

Multipliers can be built in to the debiting or crediting side of the metrics to create incentives for avoidance of impacts or preservation of habitat in high priority areas. Reserve ratios or retirement ratios can be used to set aside credits for unexpected events or to permanently retire a proportion of credits, never to be used as offsets, to insure net gain.

7. MANAGING RISK *(continued)*

7d. Reversals

Reversals may be caused by natural disturbances (unintentional reversal, such as wildfire) or anthropogenic disturbances (intentional reversal, such as development) which shorten the intended duration of compensatory mitigation. For intentional reversals, the Service recommends compensation by the party responsible for the reversal. To address this issue up front, the Service recommends establishing policies such that intentional reversals are prohibited to the extent possible, and the conservation benefits from a compensatory mitigation project are not diminished due to replacements made necessary by unforeseen intentional reversals.

Requiring the credit provider to be responsible for reversals outside of their control would likely make administration of a program more complex and decrease interest in providing credits. One recommended approach to address unintentional reversals is to establish insurance or a *reserve pool* where the amount of funding each site contributes to the pool is directly related to the amount of risk (e.g. from fire) of the site not providing habitat in the future.

Reserve pools can be established several ways, including:

- The compensatory mitigation program administrator requires that each individual mitigation provider sets aside a percentage of credits in reserve, never to be sold. In the event of an unintentional reversal, the administrator could draw from the pool of credits to make up for the lost conservation.
- An insurance premium, based on the number of credits sought and the likelihood of unintentional reversal (i.e. a natural disturbance that may lead to loss of habitat function), is added to the cost of compensatory mitigation for the debits requested. The insurance premium would then be used to generate additional compensatory mitigation projects that generate credits for the insurance pool. In the event of an unintentional reversal that generates unintentional debits, the compensatory mitigation program administrator would draw down credits from the pool to offset the debits.

CONCLUSION

The Service's primary goal for any sage-grouse compensatory mitigation program is to support conservation of the species by working with others in managing threats, protecting populations, and reversing declines. Implementation of robust and transparent compensatory mitigation programs and processes could contribute to reducing the need to list the species or simplify the effects of a listing and allow for well-sited actions that participate in the mitigation program to move forward smoothly. This will take a collaborative, unified approach between all stakeholders.

If we are able to work together on landscape-scale mitigation strategies for sage-grouse, we anticipate many benefits to accrue, including a streamlined permit process, increased public transparency and confidence, increased economic incentives and opportunities for landowners, and legal and scientific defensibility for actions taken under such strategies. Most importantly, we can reduce threats to the species in a manner consistent with the socio-economic needs of the local communities and states where sage- grouse occur.

APPENDIX I

Glossary

NOTE

The Service does not have formal definitions for a majority of these terms. Definitions were derived from existing policy and guidance where available but modified for the purposes of this document.

Additionality – A property of compensatory mitigation where the conservation outcomes are demonstrably above and beyond results that would have occurred if the mitigation had not taken place.

Baseline – the pre-existing condition of a defined area that can be quantified by an appropriate metric or metrics to determine level of function or value and re-measured at a later time to determine if the same area has increased, decreased, or maintained the same level of function or value.

Candidate Conservation Agreement (CCA) – a formal agreement between the Service and one or more federal or non-federal parties to address the conservation needs of proposed or candidate species, or species likely to become candidates for listing under the ESA, in which participants voluntarily commit to implementing specific actions that will help remove or reduce the threats to these species.

Candidate Conservation Agreement with Assurances (CCAA) – a formal agreement between the Service and one or more non-federal parties who voluntarily agree to manage their lands or waters to remove threats to candidate or proposed species and in exchange receive assurances that their conservation efforts will not result in future regulatory obligations in excess of those they agreed to at the time they entered into the agreement.

Compensatory Mitigation (Offset) – the preservation, enhancement, restoration and/or establishment of a resource to compensate for or offset unavoidable adverse impacts to the resource elsewhere.

Conservation Bank – a site or suite of sites established under a Conservation Bank Agreement that provides ecological functions and services expressed as credits that are conserved and managed in perpetuity for specified evaluation species and used to offset impacts occurring elsewhere to the same evaluation species. The establishment, operation, and use of a conservation bank require a conservation bank agreement between the Service and the bank sponsor (USFWS 2003 Conservation Banking Guidance). Ensuring that the required compensatory mitigation activities are completed and successful is the responsibility of the bank sponsor. The permittee transfers their liability for success of the mitigation to the bank sponsor through the transfer of credits. Conservation banks generally provide mitigation in advance of impacts.

Conservation Bank Agreement (CBA) – the legal document for the establishment, operation and use of a conservation bank. At a minimum, the Service and a bank sponsor (the individual or entity in charge of establishment and operation of a conservation bank) enter in to a CBA. This document may also be referred to as a Mitigation Bank Instrument (MBI), Conservation Bank Instrument (CBI), Conservation Bank Enabling Instrument (CBEI), or Bank Enabling Instrument (BEI).

Conservation Objectives Team (COT, COT Report) – a February 2013 report prepared by Service and state wildlife agencies. The COT Report identifies PACs, discusses principle threats to greater sage-grouse, and provides objectives, measures and options to ameliorate these threats.

Credit – a defined unit of trade representing the accrual or attainment of functions or value at a compensatory mitigation site. For example, a credit may be expressed as a measure of surface area (e.g., an acre or hectare), linear distance, number of individuals, stage of maturity of a particular habitat type, or other appropriate metric that can be consistently quantified and traded.

Debit – a defined unit of trade representing the loss of resource functions or value at an impact or project site. The unit of measure should be the same as that for a credit within a specific mitigation system.

APPENDIX I
Glossary

Durability – ability for mitigation measures to be effective at least as long as the impacts those measures are designed to offset. Durability is often addressed through legal, financial, and management mechanisms.

Effectiveness – Effective actions or plans proposed as compensatory mitigation demonstrate timeliness, ecological durability, and are accompanied by durable site protections and financial assurances that secure and protect the conservation status of the mitigation site and credits for at least as long as associated impacts persist.

Enhancement – manipulation of existing habitat to heighten, intensify, or improve a specific resource function(s). Enhancement results in a gain of selected resource function(s).

Habitat Credit Trading Systems (Habitat Credit Exchange) – A market-based system that facilitates the exchange between interested parties of credits that represent habitat that has been restored, enhanced, established, preserved or otherwise conserved for the purpose of offsetting losses of at-risk species habitat, habitat function, or habitat value elsewhere with the goal of achieving net species conservation benefits.

Incidental Take – take of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity. Incidental take is prohibited under the ESA and its implementing regulations, but may be authorized pursuant to section 7 or 10 of the ESA.

In Kind – (for sage-grouse) habitat of a similar structural and functional type to the habitat impacted.

In-lieu Fee – a site established as part of an in-lieu fee program that provides ecological functions and services expressed as credits that are conserved and managed for specific species and are used to offset impacts occurring elsewhere to the same species. In-lieu fee programs are sponsored by government agencies or environmental not-for-profit organizations that collect funds that are used to establish in-lieu fee sites. The establishment, operation, and use of an in-lieu fee program requires an agreement between the regulating agency and the in-lieu fee sponsor. Responsibility for ensuring that the required compensatory mitigation activities are completed and successful is transferred from the permittee to the in-lieu fee program sponsor through the transfer of credits.

Landscape-scale – for the purposes of this document, a landscape is defined as a large area encompassing an interacting mosaic of ecosystems and human systems that is characterized by a set of common management concerns.

Mitigation Ratio – typically, the relationship between compensatory offset for, and impacts to, individuals of species or habitat for species. Ratios (trading ratios, multipliers, proximity factors) may be used to address uncertainty or implement policy decisions.

Net Conservation Gain – the actual benefit or gain above baseline conditions, after deductions for impacts, in habitat function or value to species covered by a mitigation program.

No Net Loss – impacts caused by the project are balanced or outweighed by measures taken to avoid and minimize the project’s impacts and compensate any residual impacts so that no loss remains.

Off-Site – an area that is neither located on the same parcel of land as the impact site, nor on a parcel of land contiguous to the parcel containing the impact site.

Out of Kind – (for sage-grouse) habitat of a different structural and functional type from the impacted habitat.

Performance Standards – observable or measurable administrative or ecological (physical, chemical, or biological) attributes that are used to determine if a compensatory mitigation project meets the agreed upon objectives.

APPENDIX I
Glossary

Permittee Responsible Mitigation – a mitigation site that provides ecological functions and services established as part of the conservation measures associated with a permittee' s action. The permittee retains responsibility for ensuring that the required compensatory mitigation activities are completed and successful. Each permittee-responsible mitigation site is linked to the specific activity that required the offset. Permittee-responsible mitigation approved for a specific action is not transferable and cannot be used for other mitigation needs.

Prelisting Mitigation – (in this document) conservation measures benefitting a non-federally listed species that are recognized in a Service prelisting mitigation agreement and undertaken prior to the determination that the species to be benefited is a federally endangered or threatened species.

Preservation – maintenance or retention of existing habitat with specific resource function(s) for a species. This term usually implies legal protection of existing and functioning habitat, for example a parcel of land protected under a conservation easement.

Priority Areas for Conservation (PACs) – key areas that states have identified as crucial to ensure adequate representation, redundancy, and resiliency for conservation of its associated population or populations of greater sage-grouse. PACs are identified in the COT Report.

Program Administrator – The entity with enforcing authority for the establishment, operation, and management of a mitigation program.

Reserve Account (Reserve Pool) – a pool of issued credits, managed by the program administrator, intended to cover risks from intentional or unintentional reversals on mitigation sites.

Restoration – returning a site to its natural/historic habitat type with the same or similar functions.

Retired Credits (Retirement Ratio) – proportion of credits set aside and not ever to be used as compensatory mitigation.

Reversal – compensatory mitigation that does not persist for the full duration due to unplanned circumstances, whether through natural or man-made intentional or unintentional causes.

Service Area – the geographic area within which impacts to a species' habitat can be offset at a particular habitat offset site as designated in an agreement or program; specific to third party mitigation, the geographic area within which habitat credit trading occurs.

Split Estate – surface rights and subsurface rights (such as the rights to develop minerals) for a piece of land are owned by different parties.

Stacking (Credit Stacking) – generating multiple mitigation credit types on the same parcel of land.

Verification – process(es) used to confirm that mitigation program rules have been followed. Verification provides a standardized process for reporting and monitoring.

APPENDIX II
Questions Guide

NOTE

These questions, in conjunction with the principles, standards, and program elements outlined in the Framework, are intended to guide development of individual sage-grouse mitigation programs.

I. MITIGATION PROGRAM GOALS AND OBJECTIVES

1. How does the mitigation program aim to avoid impacts to sage-grouse and achieve a net conservation gain by mitigating for unavoidable impacts to sage-grouse across all habitats? At what scale(s) will this be measured?
2. How does the mitigation program address equitability (i.e. how will the mitigation hierarchy be applied across impact types and land ownerships in an equitable manner)?
3. What are other basic objectives of the program (e.g. implementable regardless of listing, cover other resources)?

II. COVERED ACTIVITIES

1. How are sage-grouse habitat classifications defined for the covered area (e.g., core, low density, occupied habitat, seasonal)?
2. Will any sage-grouse habitat type not be included in the mitigation program (and why)?
3. How will the program account for non-surveyed or unclassified habitats?
4. Will any other regulated resources be covered by the program (e.g. big game winter range, Bald and Golden Eagle Act, wetlands/Clean Water Act, etc.)?
5. What types of development activities will be covered?
6. What existing regulatory mechanisms relate to covered activities, and which entities provide this overview (e.g. permit requirements)?
7. Which development activities have been identified as threats to sage-grouse (e.g. *see* 2013 COT Report)?
8. How much demand for compensatory mitigation are development activities expected to create?
9. Does there need to be a process to include other development activities in the future?

III. MITIGATION PROGRAM GOVERNANCE

1. Is the program a stand-alone local or state-managed effort, or a jointly managed effort between state, federal, tribal and/or other agencies?
2. Who is in charge of administering different parts of the mitigation program?
3. What mechanism (agreement, legislation, etc.) identifies the responsible parties for managing the mitigation program?
4. How are relationships among different agencies and stakeholders managed?
5. How will the program operations be funded?
6. What compensatory mitigation transaction models will be supported (e.g. conservation banking, permittee-sponsored mitigation, credit exchange, in-lieu fee)?
7. How will any compensatory mitigation funds be managed and by whom?
8. What trigger points can be identified that would indicate that changes to the program are needed and how will changes be implemented?

APPENDIX II
Questions Guide

9. Is the mitigation program transparent and does it inform participants of the potential for information to be publicly disclosed by participation in these programs"?
10. How will information on impacts, offsets, and any credit trading be tracked?
11. How are the results reported to the Service or others?
12. Will the Service play a role in any part of the program (development, review, etc.)?
13. Will prelisting mitigation (for potential use in a post-listing scenario) be part of the program and if so, what will the agreement with the Service look like?
14. How will the program provide for coordination across jurisdictions (including across states)?

IV. MITIGATION HIERARCHY

A. Avoiding Impacts

1. What triggers review and entry into the mitigation hierarchy process?
2. Are there any avoidance or exclusion areas (e.g. NSO, lek buffers, etc.)?
3. What measures are used to determine if habitat is avoided? How are direct and indirect impact measures included?
4. What criteria or regulatory mechanisms are used to emphasize, require, and/or enforce avoidance? Specifically, what compliance measures are in place to ensure avoidance (e.g. permit denial)?
5. Is there a cap on disturbance, and at what scale and in which sage-grouse habitat types does it apply? Does it include direct and indirect impacts? What are the data source and methods used to measure avoidance?

B. Minimizing Impacts

1. Under what circumstances will minimization measures be employed?
2. What practices can developers use to minimize impacts?
3. What criteria or regulatory mechanisms are used to require and/or enforce minimization? Specifically, what compliance measures are in place to ensure impacts are minimized (e.g. permit denial)?
4. How are minimization measures monitored and are there triggers for adaptive management?

C. Rectifying Impacts

1. Is there an identified timeframe that rectification must occur?
2. How will the time lag between impact and rectification be offset?
3. What baseline will be used to determine whether rectification has occurred?
4. How are rectification measures monitored?
5. If rectification measures are not adequate who enforces compliance?
6. Who verifies that rectification is complete and adequate?

APPENDIX II

Questions Guide

D. Compensating (Offsetting) for Unavoidable, Residual Impacts

a) Impact (Debit) Assessment

1. How should impacts generally be measured, in other words, what constitutes a “debit” (e.g. functional acres, acres, number of birds)?
2. Will habitat measures take in to account rarity, vulnerability, or conservation priority?
3. Will impact assessments take in to account duration (i.e. temporary versus permanent impacts)?
4. From what baseline will impacts be calculated (e.g. current condition)?
5. How will the impact assessment method address direct impacts, indirect impacts, and cumulative effects?
6. Who can measure impacts? Will these calculations be verified?

b) Offset (Credit) Assessment

1. How should offsets generally be measured, in other words, what constitutes a “credit” (e.g. functional acres, acres, number of birds)?
2. From what baseline will offsets be calculated? In other words, are credits awarded on the difference between current and future condition (emphasizes enhancement and restoration), or just on future condition (emphasizes preservation), or on future condition with a minimum enhancement requirement?
3. How will risk and uncertainty of restoration and management factor into offset calculations?
4. How will duration of impacts (e.g. temporary versus permanent) factor into offset calculations?
5. Who can measure offsets? Will these calculations be verified and by whom?

c) Impact to Offset (Debit or Credit) Relationship

1. Will the quantification methods (metrics) for debits and credits be the same? If not, why?
2. How will the outcomes of the debit and credit metrics combine into a credit quantity to ensure that impacts are offset such that there is a net gain to sage-grouse (e.g. via ratios, multipliers)?
3. How will the timing of mitigation implementation (e.g. in advance of, concurrent with, or subsequent to impacts) factor into offset calculations (e.g. with ratios, caps on actions that result in time lags in critical areas, etc.)?
4. Under what circumstances would demonstration of functional mitigation in advance of impacts be required?
5. What criteria will be used to determine when in-kind or out-of-kind mitigation for habitat types (e.g. brood rearing, wintering, and nesting) is more appropriate?
6. What process is in place to adaptively manage the metrics?
7. What process is in place to approve new metrics?
8. How are service areas defined?
9. Will there be a mechanism to allow for trades to occur outside of service areas?
10. What mechanisms are in place to provide for or use credit available in other programs or states?

APPENDIX II
Questions Guide

d) Criteria for Compensatory Mitigation (Offset) Projects

1. What criteria are used for locating and prioritizing sites for compensatory mitigation?
2. Is there a preference for compensatory mitigation on a particular land ownership type (e.g. public, private) and why?
3. What pre-conditions must a site meet before being able to provide mitigation credits?
4. Will there be a minimum number of credits or site functionality before any credits are released?
5. How do other agreements (e.g. CCA, CCAA, SGI) affect eligibility to sell credits?
6. What constitutes on-site versus off-site mitigation, and when, if ever, is on-site mitigation preferred?
7. Does less than permanent protection count? If yes, how and why?
8. What is the process when impacts are proposed near or on compensatory mitigation sites?
9. Is credit provided for avoided loss? Under what circumstances?
10. What constitutes additionality (e.g., above and beyond legal requirements, above business as usual, etc.)? Does this differ by land ownership and if so, why?
11. What are the mechanisms for ensuring durability of protection on various land ownership types? How are split estates handled?
12. What conservation types (e.g., preservation, enhancement action, etc.?) and actions (e.g. juniper removal, fence marking) can generate credits?
13. How will preservation or restoration effect timing of the release of credits? Are credits released up front or based on administrative or ecological performance standards?
14. Who verifies credits (e.g., permitting agencies, third parties, etc.)?
15. Who approves the final mitigation agreement for a site and certifies release of credits?
16. How do you ensure that the credits represent the right conservation in the right locations?
17. What role, if any, can public funds or restricted conservation dollars play in mitigation (e.g., Farm Bill dollars)?
18. Can other resources be stacked on sage-grouse mitigation sites (e.g. carbon, wetlands)?
19. How will ongoing stewardship be ensured (e.g., proof of endowment or maintenance funds, when funds should be set aside, designation of a steward, qualifications of a steward)?
20. For each eligible conservation practice, what criteria will make sure it is implemented and maintained correctly?
21. What performance standards and monitoring techniques/durations will be applied at mitigation sites? Will there be standardized defaults, or will everything be site-specific?
22. What happens if performance standards are not being met either because of force majeure or things within a credit developer’s control? Specifically, how will wild fire be addressed?
23. What content needs to be in the monitoring reports and how often and to who are they submitted?
24. What constitutes success? Does it include presence of the species?

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NEVADA SAGEBRUSH ECOSYSTEM PROGRAM

2014 Nevada
Greater Sage-Grouse
Conservation Plan

2014 Nevada Greater Sage-grouse Conservation Plan

Sagebrush Ecosystem Program
State of Nevada

October 1, 2014
As updated at the April 9, 2015 and May 14, 2015 SEC meetings

On April 22, 2013, the Sagebrush Ecosystem Council (SEC) recommended the development of the 2012 State Plan into a more comprehensive and detailed strategy. The SEC considered proposed revisions over a series of meetings starting in July 2013. Each SEC meeting was held in compliance with the Nevada Open Meeting Law, including multiple opportunities for public comment. The result of those efforts is this document, the 2014 Nevada Greater Sage-grouse Conservation Plan (2014 State Plan).

2014 Nevada Greater Sage-Grouse Conservation Plan

October 1, 2014
As updated at the April 9, 2015 and May 14, 2015 SEC meetings

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Governor Brian Sandoval

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CONTENTS

LIST OF ACRONYMS

AML	Appropriate Management Level
AMP	Allotment Management Plan
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BAR	Burned Area Rehabilitation
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CCS	Conservation Credit System
CDP	Conservation Districts Program
DCNR	Department of Conservation and Natural Resources
DOD	Department of Defense
DRI	Desert Research Institute
EIS	Environmental Impact Statement
ERT	Expert Review Team
ES	Emergency Stabilization
ESA	Endangered Species Act
ESD	Ecological Site Description
FIAT	Fire and Invasives Assessment Team
HA	Herd Area
HMA	Herd Management Area
HTNF	Humboldt-Toiyabe National Forest
HQT	Habitat Quantification Tool
HSI	Habitat Suitability Index
ICS	Incident Command System
LAWG	Local Area Working Group
LUP(A)	Land Use Plan (Amendment)
MOU	Memorandum of Understanding
NAC	Nevada Administrative Code
NBMG	Nevada Bureau of Mines and Geology
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service

NRS	Nevada Revised Statutes
NWCG	National Wildfire Coordination Group
OHV	Off-Highway Vehicle
PFC	Proper Functioning Condition
P-J	Pinyon and Juniper
PMU	Population Management Unit
ROW	Right-of-Way
RSF	Resource Selection Function
SAP	Strategic Action Plan
SD	Standard Deviation
SEC	Sagebrush Ecosystem Council
SEP	Sagebrush Ecosystem Program
SETT	Sagebrush Ecosystem Technical Team
SEZ	Solar Energy Zone
SGMA	Sage-Grouse Management Area
SUA	Special-Use Authorization
TNR	Temporary Non-Renewable
UNR	University of Nevada, Reno
USDA- ARS	U.S. Department of Agriculture – Agricultural Research Service
USDA-APHIS	U.S. Department of Agriculture - Animal and Plant Health Inspection Service
USFS	U.S. Forest Service
USFWS	U.S .Fish and Wildlife Service
USGS	U.S. Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WHBT	Wild Horse and Burro Territory

1.0 INTRODUCTION

The greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) is a historically and culturally significant species in Nevada. Sage-grouse were a staple of the diet of Native American tribes in Nevada, including Northern Paiute and Western Shoshone (BLM 2013). In addition, sage-grouse play a prominent role in some tribal oral traditions (BLM 2013), as well in dances, customs, and celebrations (IDFG 1997, DOE 2007). Lewis and Clark noted the birds in their journey west in 1804 (IDFG 1997). Early pioneers dubbed them “sage chickens” and utilized them as an important food source over the next half century (IDFG 1997, DOE 2007). In Nevada, sage-grouse hunting laws began around 1890 (DOE 2007). From the early 1900s until the late 1920s, Nevada pursued reductions in the length of the hunting seasons and enforced bag limits due to decreasing bird populations (DOE 2007).

Sage-grouse increased in prominence as of species of interest in the West in the 1950s and 1960s due to a management need to learn more about basic sage-grouse biology (Stiver, personal communication 2014). Nevada has historically been a leader in sage-grouse conservation, including conducting one of the first ever scientific studies of sage-grouse in the O’Neil Basin and hosting the second ever Western Association of Fish and Wildlife Agencies (WAFWA) Sage-grouse Workshop in Elko (Stiver, personal communication 2014). State fish and game agencies began counting sage-grouse on breeding grounds, called “leks” as early as the 1930s (Stiver, personal communication 2014). Nevada has records of lek counts that date back to the 1950s (Stiver, personal communication 2014). In the later part of the twentieth century, Nevada continued its leadership role in sage-grouse conservation as a pioneer in sage-grouse monitoring techniques and scientific research, as well as by working with WAFWA to develop sage-grouse guidelines for habitat, population, and management (Stiver, personal communication 2014).

In 2000, then Governor Kenny Guinn appointed a task force representing various interest groups and agencies to develop a plan that would conserve and protect Nevada’s sage-grouse and their habitat. In October 2001 the Nevada Sage-grouse Conservation Strategy identified challenges, offered potential solutions, and laid the groundwork for the formation of local area working groups (LAWG) and Population Management Units (PMU; Figure 1). It provided guidance for developing conservation plans and subsequent legislative endorsements in 2004 and 2010 reinforced Nevada’s commitment to conserve the species.

From 2001 to 2004 the Governor’s Sage-grouse Conservation Team under leadership of the Nevada Department of Wildlife (NDOW) completed an intensive planning effort for the State in which LAWGs developed plans for their respective areas and PMUs. In June 2004, the *1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California* (2004 State Plan) was completed. Between 2004 and the present, resource management agencies have implemented conservation projects and instituted policies to support the conservation goals in the 2004 State Plan.

On March 23, 2010, the U.S. Fish and Wildlife Service (USFWS) determined that listing the sage-grouse was warranted under the Endangered Species Act of 1973, as amended (ESA), but precluded due to higher priority species. Consequently, sage-grouse were placed on the federal candidate species list. The USFWS later entered into a court settlement with several environmental groups, which included a schedule for making listing determinations on over 200 candidate species, including the sage-grouse. A proposed decision for sage-grouse is scheduled for September 2015.

In response, the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) developed their National Greater Sage-grouse Planning Strategy in late 2011, a process to revise existing land use plans (LUPs) in order to provide regulatory mechanisms to conserve sage-grouse and their habitats. Secretary Salazar invited the states impacted by a potential sage-grouse listing to develop state-specific regulatory mechanisms to conserve the species which could be considered as an alternative in the BLM and USFS LUP revision process.

On March 30, 2012, Governor Sandoval fortified Nevada’s commitment to sage-grouse conservation, by issuing Executive Order 2012-09, which established the Governor’s Greater Sage-grouse Advisory Committee (Advisory Committee) with a directive to provide updated recommendations for sage-grouse conservation in Nevada in order to preclude the need to list sage-grouse under the ESA and provide an alternative for consideration in the BLM/ USFS LUP revision process for Nevada. Those efforts resulted in the *Strategic Plan for Conservation of Greater Sage-Grouse in Nevada* (2012 State Plan), completed on July 31, 2012, which consisted of a list of primary threats to sage-grouse in Nevada and recommendations to the Governor on strategies and actions to conserve sage-grouse in Nevada.

One of the main recommendations of the 2012 State Plan was the creation of the Sagebrush Ecosystem Program (SEP), which would consist of the Sagebrush Ecosystem Council (SEC) and the Sagebrush Ecosystem Technical Team (SETT; see Section 5.0). The SEC was originally established under Executive Order 2012-19, on November 19, 2012, and later codified under state statute NRS Chapter 232.162. The SETT began work on February 11, 2013. On April 22, 2013, the SEC directed the SETT to further develop the recommendation in the 2012 State Plan into a more comprehensive and detailed strategy. The SEC considered proposed revisions over a series of meetings starting in July 2013. Each SEC meeting was held in compliance with the Nevada Open Meeting Law, including multiple opportunities for public comment. The result of those efforts is this document, the *2014 Nevada Greater Sage-grouse Conservation Plan* (2014 State Plan).

The 2014 State Plan represents the best available scientific information, as well as stakeholder input, to develop a sage-grouse conservation plan specific to Nevada. This is meant to be a “working document” that will be updated as new science emerges and lessons are learned through implementation of the 2014 State Plan, through an adaptive management framework.

In addition to the 2014 State Plan, the SEP is in the process of developing a *Nevada Sage-grouse Strategic Action Plan* (SAP). The 2014 State Plan provides broad goals, objectives, and management actions to ameliorate the primary threats to sage-grouse in Nevada. The SAP will be a companion document to the 2014 State Plan and will go into greater detail and identify areas to focus conservation efforts in order to achieve the broad goals and objectives outlined in the 2014 State Plan. The SAP will look to identify funding sources to implement the management actions recommended in the 2014 State

Plan. The SAP will identify where the primary threats to sage-grouse habitat are located across the landscape and provide specific guidance on how to ameliorate these threats based on local area conditions, resistance and resilience regimes, and ecological site descriptions. The SAP will help guide how and where the management efforts identified in the 2014 State Plan are prioritized in order to achieve landscape-scale conservation of sage-grouse and the sagebrush (*Artemisia* spp.) ecosystem. The planning efforts of the Bi-State Distinct Population Segment Greater Sage-grouse will serve as a general template for the SAP in terms of the level of specificity needed for project planning and commitment to funding (Bi-state Technical Advisory Committee Nevada and California 2012, Bi-State Executive Oversight Committee 2014).

2.0 DEFINITIONS

Acts of Nature – An event resulting from natural processes of the earth which occur outside human control and may be unpredictable, such as wildfires or drought.

Adaptive Management - An adaptive approach that involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions.

Anthropogenic Disturbance – Any human-caused activity or action or human-created physical structures that may have adverse impacts on sage-grouse or their habitats. The term anthropogenic disturbance and its associated conservation policies includes, but is not limited to the following project categories: mineral development and exploration and its associated infrastructure; renewable and non-renewable energy production, transmission, and distribution and its associated infrastructure; paved and unpaved roads and highways; cell phone towers; landfills; pipelines; residential and commercial subdivisions; activities undertaken pursuant to special use permits and right-of-way grants; and other infrastructure development. Livestock operations and agricultural activities and infrastructure related to ranch and farm businesses (e.g. water troughs, fences, etc.) are not included in this definition.

Conservation – The wise sustainable use, preservation, enhancement, or restoration of the natural environment; including: ecosystem processes, vegetation, and wildlife.

Conservation Credit System (CCS) – A pro-active solution to ensure impacts from human activities generate a net benefit for the species, while enabling human activities vital to the Nevada economy and way of life. The Credit System creates new incentives for 1) human activities to avoid and minimize impacts to important habitats for the species, and 2) private landowners and public land managers to preserve, enhance, and restore important habitats, including reducing the threat of wildfire to important habitats for the species.

Enhancement – Manipulation of existing habitat to improve specific habitat functionality.

Habitat – An area that provides food, cover, water, and space for an organism. It is the resources and conditions present in an area that are required by a species to carry out its life. Habitat implies more than just vegetation or vegetation structure; it is the sum of the specific resources that are needed by an organism. Other resources that influence habitat include physical and biological characteristics, such as: climate, precipitation, elevation, topography, water availability, soil type, etc.

Specific to this State Plan:

Suitable Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values greater than 1.5 standard deviations below the mean value of the index. These areas are identified as generally meeting the needs for sage-grouse to survive and reproduce.

High Suitability Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values greater than 0.5 standard deviations below the mean.

Moderate Suitability Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values between 1.5 and 0.5 standard deviations below the mean.

Non-Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values less than 1.5 standard deviations below the mean value of the index. These areas are identified as generally not meeting the needs for sage-grouse to survive and reproduce.

Habitat Quantification Tool (HQT) – The method for quantifying impacts ("debits") or benefits ("credits") to sage-grouse habitat characteristics generated by participants in the Nevada CCS. It is intended to provide an effective means for targeting credits and debits to the most beneficial locations for the sage-grouse, and tracking the contribution of the CCS to sage-grouse habitat and population goals.

Invasive Plants – A non-native plant that effectively reproduces, is able to outcompete native plants, may alter ecosystem processes, and may be difficult to control or eradicate. Invasive plants can be considered by the State Quarantine Officer for the designation of "noxious".

Lek – Traditional courtship display and mating areas attended by sage-grouse in or adjacent to sagebrush dominated nesting habitat. Leks are generally situated on gentle terrain in relatively open areas with less herbaceous and shrub cover than surrounding areas (Connelly et al 2004).

Noxious Weeds – Any species of plant which is currently or likely to become detrimental, destructive or difficult to control and is designated by the State Quarantine Officer as "noxious". These weeds are regulated by Nevada Revised Statute 555.130 – 555.201 and the designation and categorization of noxious weeds can be found in Nevada Administrative Code 555.010.

Population Management Units (PMUs) – General delineations of sage-grouse populations for management in Nevada. PMUs are based on aggregations of leks, understanding of habitats, and potential boundaries to populations (such as mountains and valleys). These were developed by NDOW for the 2001 State plan and refined in the 2004 State Plan (see Figure 1).

Preservation – Maintenance or retention of existing habitat quality and ecosystem functions currently used by or in close proximity to habitat used by sage-grouse through a variety of management tools, both active and passive.

Reclamation – Actions performed during or after an exploration project or mining operations to shape, stabilize, re-vegetate, or otherwise treat the land in order to return it to a safe, stable condition consistent with the establishment of a productive post-mining use of the land and the abandonment of a facility in a manner which ensures the public safety, as well as the encouragement of techniques which minimize the adverse visual effects (NRS Chapter 519A.100).

Rehabilitation – Re-vegetation of a site to achieve basic ecological functions, such as preventing soil erosion, but which does not return a site to its reference state according to its ecological site description.

Resource Selection Function (RSF) – Any model that yields values proportional to the probability of use of a resource unit. RSF models often are fitted using generalized linear models (GLMs) although a variety of statistical models might be used. RSFs were used in the development of the habitat suitability model (Section 6.0; Boyce et al. 2002).

Restoration – The reestablishment of ecologically important habitat or other ecosystem resource characteristics and function(s) at a site where they have ceased to exist, or where they exist in a substantially degraded state, and that renders a positive biological response by the habitat.

Sage-Grouse Management Area (SGMA) – The spatial extent of sage-grouse management in Nevada. The overarching objective of Nevada's plan is to achieve conservation through net conservation gain of sage-grouse habitat due to new anthropogenic disturbances within the SGMA.

Core Management Areas – Areas of high estimated space use in suitable sage-grouse habitat in the State of Nevada. These areas represent the strongholds (or "the best of the best") for sage-grouse populations in the State and support the highest density of breeding populations.

Priority Management Areas – Areas that are determined to be highly suitable habitat for sage-grouse in areas of estimated low space use and areas of non-habitat which overlap with areas of estimated high space use.

General Management Areas – Areas determined to be moderately suitable habitat for sage-grouse in areas of estimated low space use.

Non-Habitat Management Areas – Areas within the SGMA determined to be unsuitable for sage-grouse.

Site Specific Consultation Based Design Features – Measures or actions designed to minimize adverse effects to sage-grouse and their habitats due to disturbances.

Space Use Index – Continuous surface mapping developed based on lek attendance and density coupled with probability of sage-grouse occurrence relative to distance to nearest lek.

WAFWA Management Zones – Range-wide sage-grouse management delineations based on populations within floristic provinces. These were developed to guide sage-grouse conservation goals and range-wide management outlined in the 2006 Greater Sage-grouse Comprehensive Conservation Strategy developed by WAFWA.

3.0 CONSERVATION GOALS AND OBJECTIVES

The State's goal for the conservation of sage-grouse in the State of Nevada is to provide for the long-term conservation of sage-grouse by protecting the sagebrush ecosystem upon which the species depends. Redundant, representative, and resilient populations of sage-grouse will be maintained through amelioration of threats; conservation of key habitats; mitigation for loss of habitat due to anthropogenic disturbances; and restoration or rehabilitation of habitat degraded or lost due to Acts of Nature.

Achieving the State's goal for the conservation of sage-grouse will provide benefits for the sagebrush ecosystem and for many other sagebrush obligate species. Sage-grouse are known to be an "umbrella species" for many sagebrush obligate and associated species (Hanser and Knick 2011). The enhancement and restoration measures that bring resiliency and restore ecological functions to sagebrush ecosystems will also serve to ensure quality habitat for sage thrasher, sage sparrow, Brewer's sparrow, sagebrush vole, pygmy rabbit, pronghorn antelope, mule deer, and many other species.

The State's goal will be met through specific conservation objectives for anthropogenic disturbances and Acts of Nature, principally large acreage wildland fires and subsequent invasion or potential domination by non-native species. This combined strategy creates the regulatory framework through which sage-grouse habitat can be conserved and the decline of sage-grouse populations can be stopped in the State of Nevada. This section of the Plan details related policies and an adaptive management approach that will provide guidance to achieve these objectives.

The guiding principles that create the balanced foundation and vision for a coordinated, management approach to conserve sage-grouse and the sagebrush ecosystem in Nevada are as follows:

- Conserve sage-grouse and their habitat in Nevada while maintaining the economic vitality of the State.
- Due to the broad reach of sage-grouse habitat, effective management and implementation of sage-grouse conservation actions must be conducted through a collaborative, interagency approach that engages private, non-governmental, local, state, Tribal and federal stakeholders to achieve sufficient conservation of the sage-grouse and their habitat.
- Monitoring and adaptive management will be employed at all levels of management in order to acknowledge potential uncertainty upfront and establish a sequential framework in which decision making will occur in order to learn from previous management actions.

3.1 Anthropogenic Disturbances

3.1.1 <u>Conservation Objective</u> – Net conservation gain due to new anthropogenic disturbances

The overarching objective of Nevada's plan is to achieve conservation through net conservation gain of sage-grouse habitat due to new anthropogenic disturbances within the Sage-Grouse Management Area (SGMA; Figure 2) in order to stop the decline of sage-grouse populations. Net conservation gain is defined as the State's objective to maintain the current quantity and quality of sage-grouse habitat within the SGMA at the state-wide level by protecting existing sage-grouse habitat or by mitigating for loss due to anthropogenic disturbances. Mitigation requirements are determined by the Conservation Credit System. This objective will be measured by the credit to debit ratio.

Anthropogenic disturbance is defined here as any human-caused activity or action or human-created physical structures that may have adverse impacts on sage-grouse or their habitat. The term anthropogenic disturbance and its associated conservation policies will include, but not limited to the following project categories: mineral development and exploration and its associated infrastructure; renewable and non-renewable energy production, transmission, and distribution and its associated infrastructure; paved and unpaved roads and highways; cell phone towers; landfills; pipelines; residential and commercial subdivisions; activities undertaken pursuant to special use permits and right-of-way grants; and other infrastructure development. Livestock operations and agricultural activities and infrastructure related to ranch and farm businesses (e.g. water troughs, fences, etc.) are not included in this definition, though Section 7.5 and Appendix A address how to minimize impacts to sage-grouse and their habitat from these activities.

3.1.2 <u>Conservation Policies</u> – "Avoid, Minimize, Mitigate"

The State of Nevada's overriding policy for all management actions within the SGMA is to "avoid, minimize, and mitigate" impacts to sage-grouse habitat.

This is a fundamental hierarchical decision process that seeks to:

Avoid – Eliminate conflicts by relocating disturbance activities outside of sage-grouse habitat in order to conserve sage-grouse and their habitat. Avoidance of a disturbance within sage-grouse habitat is the preferred option. If impacts are not avoided, the adverse effects will need to be both minimized and mitigated.

Minimize – Impacts will be minimized by modifying proposed actions or developing permit conditions to include measures that lessen the adverse effects to sage-grouse and their habitat. This will be accomplished through Site Specific Consultation Based Design Features (Design Features), such as reducing the disturbance footprint, seasonal use limitations, co-location of structures, etc. Minimization does <u>not</u> preclude the need for mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.

Mitigate – If impacts are not avoided, after required minimization measures are specified, residual adverse effects on designated sage-grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the sage-grouse habitat that will result in net conservation gain of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.

Proposed anthropogenic disturbances within the SGMA will trigger timely consultation with the SETT for assessment of impacts to sage-grouse and their habitats and compliance with SEC and other relevant agency policies. All currently mapped sage-grouse habitat is located within the SGMA. Specifics of the SETT Consultation will be detailed in a Memorandum of Understanding (MOU) between the applicable State and Federal agencies, still under development. SETT Consultation is designed to provide a regulatory mechanism to ensure that sage-grouse conservation policies are applied consistently throughout the State and streamline the federal permitting process.

Determination of sage-grouse habitat will be based on the Nevada Habitat Suitability Map (Figure 3)[1]. At the onset of a proposed project, habitat evaluations or “ground-truthing” of the project site and its surrounding areas shall be conducted by a qualified biologist with sage-grouse experience using methods as defined in Stiver et al (2010), or other mutually agreed to scientifically valid techniques, to confirm habitat type. Evaluations can be conducted by the SETT or NDOW at the request of the project proponent.

The specific steps for the implementation of the “avoid, minimize, mitigate” policy are as follows:

Avoid

Project proponents must first seek to avoid disturbance in sage-grouse habitat within the SGMA. If the project is located entirely outside of habitat, but within the SGMA it will still be analyzed for indirect effects, such as noise and visual impacts. A project will only be considered to have avoided impacts if it is physically located in non-habitat and it is determined to have no indirect impacts affecting designated habitat within the SGMA. If this is determined, no further consultation with the SETT is required.

It is important to note that the avoid step is not an “all or nothing” concept. If the entirety of a project cannot be relocated to non-habitat, alternatives will be explored to relocate portions of the project to non-habitat. (For example, if a mine cannot be relocated into non-habitat, power distribution lines associated with the project may be relocated to non-habitat.) This may reduce minimization and mitigation requirements for the project proponent.

Anthropogenic disturbances should be avoided within the SGMA. If avoidance cannot be reasonably accomplished, the project proponent must demonstrate why it cannot be reasonably accomplished (as described in Table 3-1) in order for the SETT to consider minimization and mitigation alternatives. The process to demonstrate that avoidance cannot be reasonably accomplished (the “avoid process”) is

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[1] Higher resolution maps are available at: http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/HSM/3-%20NV%20Management%20Categories%20Version%202.pdf

determined by four management categories (Figure 4), which consider both sage-grouse breeding population density and habitat suitability within the SGMA. This approach was taken in order to minimize impacts to areas with higher estimated sage-grouse use and habitat quality. Definitions and methods for developing the management categories are provided in Section 6.0.

The burden of proof to demonstrate that avoidance cannot reasonably be accomplished within the SGMA will be on the project proponent and will require the project proponent to demonstrate the specified criteria listed in Table 3-1 as determined by the management categories the proposed project is located in. Exemptions to the avoid policy will be granted if all the criteria in Table 3-1 are met. A higher burden of proof is set for project proponents to demonstrate that avoidance cannot be reasonably accomplished in areas that have higher densities of sage-grouse populations and suitable habitat.

Table 3-1. The Avoid Process for Proposed Anthropogenic Disturbances within the SGMA

Anthropogenic disturbances should be avoided in habitats within the SGMA. If project proponents wish to demonstrate that a disturbance cannot be avoided, exemptions will be granted if the criteria listed in the table can be met for the applicable management category.

Core Management Areas (“best of the best”)	Priority Management Areas	General Management Areas	Non-habitat Management Areas
• Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible; • Demonstrate that the individual and cumulative impacts of the project would not result in habitat fragmentation or other impacts that would cause sage-grouse populations to decline through consultation with the SETT; • Demonstrate that sage-grouse population trends within the PMU are stable or increasing over a ten-year rolling average; • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible; • Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and, • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System. Mitigation rates will be higher for disturbances within this category.	• Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible; • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. If co-location is not possible, siting should reduce individual and cumulative impact to sage-grouse and their habitat; • Demonstrate that the project should not result in unnecessary and undue habitat fragmentation that may cause decline in sage-grouse populations within the PMU through consultation with the SETT; • Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and, • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System.	• Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible; • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible; • Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and, • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System.	• Demonstrate that the project will not have indirect impacts to sage-grouse and their habitats. If it cannot be demonstrated, the project proponent will be required to develop Site Specific Consultation Based Design Features to minimize impacts and compensatory mitigation will be required.

Core Management Areas

The Core Management Areas support high densities of sage-grouse and areas of high estimated space use in suitable habitat (See Section 6.0 for details on technical language). These areas include approximately 85% of space use by sage-grouse in the State of Nevada. These areas represent the strongholds (or "the best of the best") for sage-grouse populations in the State of Nevada and support the highest density of breeding populations. Thus, the management strategy is to conserve these areas by avoidance of anthropogenic disturbances in order to maintain or improve current sage-grouse population levels.

Project proponents must seek to avoid disturbances within the SGMA. If the project proponent wishes to demonstrate that avoidance cannot be reasonably accomplished within these areas, exemptions will be granted to this restriction as part of the SETT Consultation. The project proponent must demonstrate that all of the following criteria listed below (also see Table 3-1) are met as part of the SETT Consultation process in order to be granted an exemption:

- Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible;
- Demonstrate that the individual and cumulative impacts of the project would not result in habitat fragmentation or other impacts that would cause sage-grouse populations to decline through consultation with the SETT;
- Demonstrate that sage-grouse population trends within the PMU are stable or increasing over a 10-year rolling average;
- Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible;
- Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and
- Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System. Mitigation rates will be higher for disturbances within this category.

Priority Management Areas

The Priority Management Areas encompass areas that are determined to be highly suitable habitat for sage-grouse by the Nevada Habitat Suitability Model and areas of high space use that are not contained within the Core Management Areas (See Section 6.0 for details on technical language).

Management in these areas provides more flexibility to project proponents, though avoidance in these areas is still the preferred option and project proponents are encouraged to develop outside of these areas whenever possible. Anthropogenic disturbances will be permitted in these areas if the criteria listed below (also see Table 3-1) are met as part of the SETT Consultation process:

- Demonstrate that the project cannot be reasonably or feasibly accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible;

- Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. If co-location is not possible, siting should reduce individual and cumulative impacts to sage-grouse and their habitat;
- Demonstrate that the project should not result in unnecessary and undue habitat fragmentation that may cause declines in sage-grouse populations within the PMU through consultation with the SETT;
- Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and
- Mitigate for unavoidable impacts through compensatory mitigation via the Conservation Credit System.

General Management Areas

The General Management Areas encompass areas determined to be suitable habitat for sage-grouse, though less suitable than Priority Management Areas and are not contained within the Core Management Areas (See Section 6.0 for details on technical language). Management of these areas provides the greatest flexibility to project proponents. Anthropogenic disturbances will be permitted in these areas if the criteria listed below (also see Table 3-1) are met as part of the SETT Consultation process:

- Demonstrate that the project cannot be reasonably or feasibly accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible;

- Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible;

- Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and

- Mitigate for unavoidable impacts through compensatory mitigation via the Conservation Credit System.

Non-Habitat Management Areas

The Non-Habitat Management Areas encompass areas determined to be unsuitable for sage-grouse by the Nevada Habitat Suitability Model (See Section 6.0 for details on technical language). As specified above, all proposed projects within the SGMA, including in non-habitat within SGMAs must conduct habitat evaluation or ground-truthing to confirm presence or absence of sage-grouse habitat. If areas are confirmed by habitat evaluations to be non-habitat, an analysis for indirect impacts on sage-grouse within their habitat in the SGMA will be required to determine if Site Specific Consultation Based Design Features to minimize impacts and compensatory mitigation are necessary as part of the SETT Consultation process (also see Table 3-1).

Minimize

If a project cannot avoid adverse effects (direct or indirect) to sage-grouse habitat within the SGMA, the project proponent will be required to implement Site Specific Consultation Based Design Features (Design Features) that minimize the project's adverse effects to sage-grouse habitat to the extent practicable.

Minimization will include timely consultation with the SETT to determine which Design Features would be most applicable to the project when considering site conditions, types of disturbance, etc. Some general examples could include: reducing the footprint of the project, siting infrastructure in previously disturbed locations with low habitat values, noise restrictions near leks during breeding season, and washing vehicles and equipment to reduce the spread of invasive species. Land use specific Design Features are included in Appendix A.

A list of Design Features for the project must be specified and agreed upon by the SETT and project proponent prior to the start of the project and will become part of the permit/ contract requirements issued for the project. The project proponent will be required to implement, maintain, and monitor the required Design Features in good working order throughout the duration of the project.

Mitigate

Mitigation involves the successful restoration, enhancement, or preservation of sage-grouse habitat and is designed to offset the negative impacts caused by an anthropogenic disturbance. Mitigation will be required for all anthropogenic disturbances impacting sage-grouse habitat within the SGMA. Mitigation requirements will be determined by the State's Conservation Credit System (Section 8.0).

Options for mitigation will be identified in the State's Strategic Action Plan. The State's Strategic Action Plan will identify prioritized areas on public and private lands to implement a landscape scale restoration effort. The plan will identify where the primary threats to sage-grouse habitat are located throughout the State and provide management guidance for how to ameliorate the threats based on local area conditions and ecological site descriptions. The prioritization will include efforts to use mitigation funding in areas where sage-grouse will derive the most benefit, even if those areas are not adjacent to or in the vicinity of impacted populations. This Strategic Action Plan will be updated at least every five years to reflect improvements in understanding, science, and technology for mitigation activities.

3.1.3 Adaptive Management

The SETT, in close coordination with applicable federal and state agencies, will evaluate and assess the effectiveness of these policies at achieving the objective of net conservation gain and will provide a report to the SEC annually. The objective will be considered to have been met if there is a positive credit to debit ratio within the Conservation Credit System on an annual basis. If the State falls short of its objective, the SEC will reassess and update polices and management actions based on recommendations from the SETT using the best available science to adaptively manage sage-grouse habitat.

3.2 Acts of Nature – Fire and Invasive Plants

3.2.1 Conservation Objectives –

The overarching objectives of Nevada's plan is to achieve conservation through the following short and long term objectives for Acts of Nature in order to stop the decline of sage-grouse populations and restore and maintain a functioning sagebrush ecosystem:

Short Term:

- *Reduce the amount of sage-grouse habitat loss due to large acreage wildfires and invasion* or potential domination *by non-native plants.*

Long Term:

- *Maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of non-native plants and resilient after disturbances, such as wildfire.*
- *Restore wildfire return intervals to within a spatial and temporal range of variability that supports sustainable populations of sage-grouse and other sagebrush obligate species.*

The Greater Sage-grouse Advisory Committee, using the best available science, identified fire and invasive plant species, principally cheatgrass (*Bromus tectorum*), as the primary threat to sage-grouse and their habitat in the State of Nevada. The State acknowledges these threats must be adequately addressed in order to achieve the conservation goal for sage-grouse within the State of Nevada; however, it is not economically or ecologically feasible to restore all fire damaged or invasive species dominated landscapes at this point, nor is it possible to prevent all fires. The State will put forth a best faith effort to reduce the rate of sage-grouse habitat loss due to fire and invasive plant species. This objective will be measured by evaluating the amount of habitat lost due to fire over a five year rolling period. This will include an evaluation of the amount of habitat gained through post-fire sagebrush re-establishment for those communities with higher resistance and resilience, and the amount of habitat lost post fire which is subsequently dominated by invasive plant species.

3.2.2a Conservation Policies – Fire Management: Paradigm Shift

In order to address the threats of fire and invasive species, which has long challenged land managers throughout the western United States, the State proposes a paradigm shift. This would entail a more proactive, rather than reactive approach, to stop the dominance of invasive species and restore fire to within a range of variability to support sustainable populations of sage-grouse. For specific management actions associated with these policies, refer to Section 7.1 of this State Plan.

3.2.2b Conservation Policies – Invasive Plants: Prevent, Detect, Control, Restore, and Monitor

While wildfire is commonly the vector for the spread of invasive plants, such as cheatgrass, invasive plants are currently widespread throughout the Great Basin and can spread without the aid of wildfire. In order to address the general threat of invasive plants, the State proposes a policy of Prevent, Detect, Control, Restore, and Monitor. For specific management actions associated with these policies, refer to Section 7.1 of this State Plan.

3.2.3 Adaptive Management

Fire and the subsequent reestablishment of plant species (native or not) is a natural process, and consequently this threat is extremely challenging across the western United States as humans are still limited in our ability to directly control this cycle. However, scientific understanding of ecological processes and resource management techniques continues to improve. Adaptive management approaches, committed to by the State, will provide an opportunity to continue to gain a greater understanding of the ecological mechanisms that drive these processes and will subsequently lead to improvements in resource management practices that reduce the occurrence of catastrophic wildfire and minimize the risk of crossing ecological thresholds due to the invasion and subsequent potential domination by invasive annual grasses.

The SETT will evaluate and assess the effectiveness of these policies at achieving the stated short and long term objectives and will provide a report to the SEC annually. The objectives will be met if there is a decrease or leveling off of the amount of habitat loss due to the effect of wildland fire within the SGMA over a five year period. If the State and federal agencies fall short of this objective, the SEC will reassess and update polices and management actions based on recommendations from the SETT using the best available science to adaptively manage sage-grouse habitat.

4.0 DESIRED HABITAT CONDITIONS FOR GREATER SAGE-GROUSE IN NEVADA

The desired habitat conditions for sage-grouse describe what is generally considered to be the highest quality seasonal habitat for greater sage-grouse, specific to Nevada. The desired habitat conditions do not specify what is and what is not habitat, but depict the characteristics of seasonal habitats that sage-grouse in Nevada are using most successfully, based on research, data and observations in Nevada and the Great Basin. The desired habitat conditions are based on current knowledge of sage-grouse selection and demographic rates related to habitat conditions in Nevada and the Great Basin. Management to work towards these desired habitat conditions must be implemented using professional judgement that assesses ecological site descriptions (including current state and potential), adaptive management, and knowledge of authorized land uses and plans. Vegetation community responses to management techniques can be highly variable and may take years to reach desired conditions depending on a multitude of factors. Vegetation communities go through natural and human influenced successional stages over time that may or may not be progressing sites towards the desired habitat conditions. Therefore, monitoring and data collection must be conducted over a sufficient period of time to allow for an accurate accounting of whether or not a site is making progress toward the desired conditions.

The desired habitat conditions will be used to evaluate management actions and site conditions in sage-grouse habitat to ensure that 1) habitats are maintained if meeting desired conditions, or 2) habitats are trending toward these conditions if they are not being met. Management actions in sage-grouse habitats will include site-specific resource objectives (Swanson et al. 2006) using these desired habitat conditions as guidelines, while taking into account ecological site descriptions tied to state and transitions models and other locally relevant resource values and relevant information about management context and commitments. Progress of management actions will be evaluated through long-term monitoring for adaptive management. When habitat within the State is identified as not meeting these desired conditions and there are opportunities and resources available, the State will seek to work with private and public land managers to assess the causal factors and recommend adjustments in management to work towards the desired conditions with site specific resource objectives. **The desired habitat conditions in table 4-1 should not be used to conduct land health assessments and are not regulatory, but are intended to help guide planning for current and future management using adaptive management as a part of the process.** In implementation, managers must have flexibility to manage for these desired sage-grouse habitat conditions along with other desired conditions on the site, taking into consideration existing permitted uses and corresponding management plans. Also, some sites do not have the potential to meet desired sage-grouse habitat conditions, which is why resource objectives must be specific to the site.

The State of Nevada recognizes that a resilient and resistant sagebrush ecosystem should be heterogeneous (a mosaic of multiple seral phases) across the landscape and that achievement of any desired habitat conditions resulting in a large-scale homogenous landscape is not optimum. Thus, the State will work with land managers and advisors to work towards achieving or maintaining a resistant and resilient landscape informed by the desired conditions in Table 4-1 and ecological site descriptions, and to incorporate new science, adaptive management, and incentives in the future that will allow this to occur.

The desired conditions in Table 4-1 should not be reviewed, measured, or managed for, independently. Sage-grouse habitat suitability should be determined by the relationship among several indicator values including ecological site descriptions (including current state and potential) along with the relative abundance of habitat types across the landscape. These conditions apply to an area being used by sage-grouse for the appropriate life stage (microsites) and not across the entire site or landscape. The desired conditions for each seasonal habitat should only be assessed during the appropriate season of use (dates can vary annually based on climatic conditions) and in areas spatially mapped as the relevant seasonal habitat (expected from USGS in May 2015). Habitat types may not be mutually exclusive and therefore may have to be managed to meet multiple conditions or selected for the more limiting habitat in the area. It is important to understand that the desired conditions described for these habitat types are based on average plant productivity, structural data, supporting scientific literature, and expert opinion relative to sage-grouse use of sagebrush communities and they may not apply to all sagebrush communities in the planning area (Davies et al. 2006). These measures also do not account for inter-annual climate variation (e.g., precipitation) (Davies et al. 2006). Herbaceous vegetation, in particular, varies dramatically year to year; measurements for a single given year should not necessarily be used to adjust management decisions or actions. When evaluating herbaceous vegetation in areas grazed in different seasons in different years, it is important to evaluate conditions across the years of rotation, recognizing that effective management for robust healthy plants may leave more or less residual in a specific season of any one year. Individual indicator values do not define site suitability and overall site suitability descriptions require an interpretation of the relationships between the indicators, ecological site descriptions (including current state and potential), and other factors. In order to provide recommendations for management changes and adaptive management, professional expertise and judgment are required to properly assess current conditions. This should include but not be limited to inter-annual climate variation, and authorized uses and their associated plans.

These desired habitat conditions were developed by a team consisting of representatives from the USFWS, NDOW, USFS, USGS, and BLM. The team reviewed the Connelly et al. (2000) guidelines adding considerable detail and making adjustments based on regionally and locally derived data and analysis by the USGS. The State of Nevada’s Science Work Group provided input on the science behind the desired habitat conditions.

Desired Habitat Conditions for Greater Sage-Grouse.

Site-specific objectives should be defined based on ecological site descriptions and current ecological state.

Life Requisite	Habitat Indicator	Objective	Notes
GENERAL/LANDSCAPE-LEVEL			
All Life Stages	Rangeland Health Indicator Assessments	Conduct assessments in sage-grouse habitat and develop site-specific objectives informed by assessments	Pellant et al. 2005
Cover (Nesting)	Seasonal Habitat Needed	>65% of the landscape in sagebrush dominated cover	Aldridge and Boyce 2007
	Annual Grasses	<%5	Blomberg et al. 2012
Security (Nesting)	Conifer Encroachment	<3% phase I (>0- <25%cover) No phase II (25–50% cover) No phase III (>50% cover)	Casazza et al. 2011 USGS (In prep) (A)
Cover and Food (Winter)	Conifer Encroachment	<5% phase I (>0 - <25% cover) No phase II (25–50% cover) No phase III (>50%)	USGS (In prep) (A) USGS (In prep) (B)
	Sagebrush Extent	>85% sagebrush dominated land cover	USGS (In prep) (A) Doherty et al. 2008
LEK (Seasonal Use Period: 1 March – 15 May)			
Cover	Availability of Sagebrush Cover	Has adjacent sagebrush cover	Connelly et al. 2000 Blomberg et al. 2012 Stiver et al. (In press) HAF
Security[1]	Pinyon and/or Juniper Cover	<3% landscape canopy cover within 1 km of leks	Connelly et al. 2000 (modified) Stiver et al. (In press) HAF Baruch-Mordo et al. 2013 Coates et al. 2013 Manier et al. 2014
	Proximity of Tall Structures[2]	None within 3 miles (5 kilometers)	
NESTING[3] (Seasonal Use Period: 1 April- 30 June)			
Cover	Sagebrush Canopy Cover	≥20%	Kolada et al. 2009a Kolada et al. 2009b
	Residual and Live Perennial Grass Cover	≥10% if shrub cover is <25%	Coates et al. 2013 Coates and Delehanty 2010 Kolada et al. 2009a Kolada et al. 2009b
	Annual Grass Cover	<5%	Lockyer et al. (In press)
	Total Shrub Cover	≥30%	Coates and Delehanty 2010 Kolada et al. 2009a Lockyer et al. (In press)
	Perennial Grass Height	Provide overhead and lateral concealment from predators	Connelly et al. 2000 Stiver et. al. (In press) HAF Connelly et al. 2003 Hagen et al. 2007

Security[1]	Proximity of Tall Structures[2]	None within 3 miles (5 kilometers)	Coates et al. 2013 Gibson et. al. 2013 Manier et al. 2014
BROOD-REARING/SUMMER[3] (Seasonal Use Period: 15 May- 15 September) Early brood-rearing seasonal use period: 15 May- 15 June Late brood-rearing seasonal use period: 15 June- 15 September			
All brood-rearing sites			
Cover	Perennial Grass Canopy Cover and Forbs	>15% combined perennial grass and forb canopy cover	Connelly et al. 2000 Hagen et al. 2007
Cover and Food	Perennial Forb Canopy Cover	≥5% arid ≥15% mesic	Casazza et al. 2011
Early and late brood-rearing – Upland Sites Only			
Cover	Sagebrush Canopy Cover	10-25%	Connelly et al. 2000
Late brood-rearing- Riparian Sites Only			
Cover and Food	Riparian Areas/Meadows	PFC[5]	Prichard et al. 1998 Prichard et al. 1999 Dickard et al. 2015 Stiver et al. (In press) HAF
Security	Riparian Area/Meadow Interspersion with Adjacent Sagebrush	Has adjacent sagebrush cover	Casazza et al. 2011 Stiver et al. (In press) HAF
Cover	Perennial Grass Height	Provide overhead and lateral cover from predators, for thermoregulation, insects, etc.[6]	Connelly et al. 2000 Stiver et. al. (In press) HAF Connelly et al. 2003 Hagen et al. 2007
Late brood-rearing – Both Upland and Riparian Sites			
Food	Perennial Forb Availability and Understory Species Richness	Understory Species Richness- > 5 grass and forb species present	Casazza et al. 2011
WINTER[3] (Seasonal Use Period: 1November – 28 February)			
Cover and Food	Sagebrush Canopy Cover	≥10% above snow depth	Connelly et al. 2000 USGS (In prep) (C)
	Sagebrush Height	>9.8 inches (25 centimeters) above snow depth	Connelly et al. 2000 USGS (In prep) (C)

[1] Applicable to Phase I and Phase II pinyon and/or juniper.

[2] Defined as structures that provide nesting resource for Sage-grouse predators using best available science. Does not include fences.

[3] Field collection data for these seasonal habitat delineations should only be taken in the areas mapped as that habitat type (maps expected from USGS in May 2015) and during the appropriate seasonal use period. Seasonal use periods are standardized for the purposes of this table, but may fluctuate annually due to climatic conditions.

[4] Species richness should include some forb species, with consideration given to sage-grouse preferred forb species listed in Stiver et al. In Press.

[5] Site does not have to meet PFC but should be showing progress in trending toward proper functioning condition or have an upward trend if functioning at risk.

[6] Applies to grasses within sagebrush-shrub communities adjacent to riparian area. Sage-grouse generally select for perennial grass heights that are greater than what is randomly available in a given site (USGS unpublished data). Selected heights in Nevada on average range from 4" - 8" (average droop height of live plants) depending upon resistance and resilience mapping and ecological site descriptions (USGS unpublished data). Generally, sites in the northern portion of the management area trend toward the upper end and those in the southern portion trend toward the lower end of the height range (USGS unpublished data).

5.0 IMPLEMENTATION RESPONSIBILITIES

The creation of the Sagebrush Ecosystem Program (SEP) was one of the main recommendations of the 2012 Governor's Sage-grouse Advisory Committee. The SEP consists of the Sagebrush Ecosystem Council (SEC) and the Sagebrush Ecosystem Technical Team (SETT). The program is established under the Department of Conservation and Natural Resources – Division of State Lands. The program is a collaborative, multi-stakeholder approach, charged to carry out programs to preserve, restore, and enhance sagebrush ecosystems in the State of Nevada. In addition, the SEP will work with Local Area Working Groups (LAWGs) and Conservation Districts to help identify and implement on-the-ground sage-grouse and sagebrush ecosystem conservation efforts. Also, the SEP will work with local governments to avoid conflicts with sage-grouse habitat, including but not limited to urbanization issues.

Sagebrush Ecosystem Council (SEC)

The SEC was originally established under Executive Order 2012-19 and later codified under state statute NRS Chapter 232.162. The SEC consists of a nine voting member board, appointed by the Governor with representatives from the following interests: agriculture, energy, general public, conservation and environmental, mining, ranching, local government, Native American tribes, and Board of Wildlife Commissioners. In addition, the state directors of the Nevada Departments of Conservation and Natural Resources (DCNR), Wildlife (NDOW), and Agriculture (NDA), as well as the state directors for the federal agencies of BLM, USFWS, and HTNF serve as ex-officio members. The SEC is responsible for determining policy associated with the sagebrush ecosystem and sage-grouse.

The objective of the SEC is to establish and guide a consistent, transparent process to coordinate disturbance and conservation activities and set policy in the SGMA in order to provide for a resilient and resistant sagebrush ecosystem and stable or increasing sage-grouse populations.

The specific duties of the SEC include:

- Consider the best science available in its determinations regarding the conservation of sage-grouse and sagebrush ecosystems in this State;
- Establish and carry out strategies for: 1) the conservation of the sage-grouse and sagebrush ecosystems in this State; and 2) managing land that includes those sagebrush ecosystems, taking into consideration the importance of those sagebrush ecosystems and the interests of the State;
- Establish and carry out a long-term system for carrying out strategies to manage sagebrush ecosystems in this State using an adaptive management framework and providing for input from interested persons and governmental entities;
- Oversee the SETT;
- Establish and set policy for the Conservation Credit System (CCS);
- Solicit suggestions and information and, if necessary, prioritize projects concerning the

enhancement of the landscape, the restoration of habitat, the reduction of nonnative plants and the mitigation of damage to, or the expansion of, scientific knowledge of sagebrush ecosystems;

- If requested, provide advice for the resolution of conflict concerning the management of the sage-grouse or a sagebrush ecosystem in this State;
- Coordinate and facilitate discussion among persons, federal and state agencies, and local governments concerning the maintenance of sagebrush ecosystems and the conservation of the sage-grouse;
- Provide information and advice to persons, federal and state agencies and local governments concerning any strategy, system, program or project carried out under this State Plan;
- Provide direction to state agencies concerning any strategy, system, program or project carried out pursuant to this State Plan and resolve any conflict with any direction given by another state board, commission, or department jointly with that board, commission or department, as applicable;
- Submit semi-annual program progress reports to the Governor;
- Pursuant to the "Inter-Tribal Council of Nevada, Inc. Resolution & Letter of Support," (Appendix C) integrate Tribal participation in the statewide conservation effort, and acknowledge traditional Tribal ecological knowledge when available to update SGMA;
- Establish policies for the identification and prioritization of landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and other data that will contribute to decision making informed by science to increase resiliency; and
- Encourage and facilitate land management education and training for all user groups of sage-grouse habitat.

Sagebrush Ecosystem Technical Team (SETT)

The SETT is a multi-disciplinary, interagency team with representation from DCNR – Divisions of State Lands and Forestry, NDOW, and NDA. The SETT serves as staff to the SEC and advises them on the best available science.

The objective of the SETT is to implement a multi-disciplinary approach for the administration of this State Plan that incorporates various scientific and technical expertises and provides a well-defined process for assessing impacts and permitting activity in the SGMA.

The specific duties of the SETT include:

- Serve as staff to the SEC and advise the SEC on the best available science in order for them to set policy;
- Develop a comprehensive State Plan based on the recommendations from the Governor's Sage-

grouse Advisory Council;

- Oversee the day-to-day implementation of the goals, objectives, and management actions established under this State Plan. Propose revisions to the State Plan as needed;
- Coordinate the development of the CCS. In accordance with SEC policy, administer and operate the CCS once it is established;
- Work with the USGS and other technical experts to development sage-grouse habitat and management maps;
- Establish and manage a process in cooperation with applicable federal and state agency partners to update sage-grouse habitat and management maps using the best available science;
- Coordinate with the BLM and USFS and other federal and state agencies on the development of the Nevada and Northeastern California Greater Sage-grouse Land Use Plan Amendment (LUPA) and Environmental Impact Statement (EIS);
- Enter into an MOU with the BLM and USFS for agency coordination on sage-grouse management and administration of the CCS;
- Compile and submit state-wide data for the USFWS data call for the sage-grouse listing decision;
- Work with scientific and technical experts for advice on the best available science for implementing and updating management actions;
- Identify and prioritize landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and other data that will contribute to decision making informed by science to increase resiliency following wildfire;
- Provide timely consultation for project proponents who want to conduct activities in the SGMA to avoid, minimize, and mitigate impacts to sage-grouse. This will likely include robust ground-truthing for the presence or absence of habitat. Foster and maintain collaborative processes with state and federal agencies to expedite state and federal permitting, while providing for the conservation of sage-grouse;
- Secure grants and other funding opportunities to implement habitat enhancement and restoration projects;
- Develop and oversee a monitoring and adaptive management program and provide recommendations to the SEC on how to update policies based on new information learned; and
- Establish a geographic database repository to maintain the inventory of development and mitigation projects, population data, and monitoring results.

Local Area Working Groups (LAWGs)

The LAWGs provide all stakeholders with an opportunity to work together in actively managing and restoring landscapes across boundaries. Even with collaboration there is a realization that to be successful there is a need for more investment from all sources to achieve sage-grouse conservation objectives. LAWG membership includes representation from private land owners, tribes, federal land management agencies, local governments, conservation districts, USFWS, USGS, NDOW, NGO, USDA-ARS, UNR, NRCS, DOD, sportsmen, mining, energy, Off-Highway Vehicle (OHV) users, agricultural and environmental interests.

The SEP will work with the LAWGs to:

- Develop and implement site-specific plans to accomplish enhancement and restoration projects in areas that are identified by the SEP as important areas for sage-grouse conservation;
- Monitor and adaptively manage conservation actions;
- Identify potential habitat enhancement and restoration projects; and
- Provide local, site-specific expertise on a variety of issues.

Conservation Districts Program (CDP)

The CDP provides administrative support to the State Conservation Commission, which develops policy and regulations for Nevada’s twenty-eight locally elected conservation districts. The CDP is comprised of a program coordinator and three staff specialists stationed in Elko, Ely, and Winnemucca. The CDP’s role in the implementation of this State Plan is to assist in the development of on-the-ground conservation projects.

The SEP will work with the CDP to:

- Implement on-the-ground conservation and mitigation projects identified by the SEP and LAWGs, including perusing grants and other funding opportunities. Provide recommendations to the SEP on possible additional projects; and
- Facilitate communication between individual CDs, SEP, LAWGs, and other stakeholders in order to more effectively achieve on-the-ground conservation.

Local Governments

Thirteen of Nevada’s seventeen counties, as well as several cities are located within the SGMA.

The SEP will work with local governments:

- When a county or city considers a change to its master plan for a land use of higher intensity affecting the SGMA.
- To address any potential conflicts with sage-grouse habitat.

6.0 MAPPING

The SEP contracted with the USGS to serve as the lead technical and science advisor for the development of habitat suitability index (HSI) for sage-grouse in Nevada using resource selection function (RSF) modeling. The SEP used the HSI to develop habitat and management maps to be implemented through this State Plan. The SETT assembled an Expert Review Team, comprised of local sage-grouse technical experts from the UNR, BLM, NDOW, USFWS, and HTNF to advise the SETT on technical aspects of the mapping process.

Methods

The State's process for developing spatially explicit maps for sage-grouse habitat and sage-grouse management areas was completed in four stages: 1) development of the HSI; 2) classification of the HSI into suitability categories; 3) development of a space use index; and 4) merging the habitat suitability categories and space use index to develop management categories. The methods for each of these stages are outlined below.

Habitat suitability index

Model averaged RSFs were used to develop HSIs that ranked areas of the State based on a continuum of sage-grouse selection, from highly selected for to strongly avoided. The modeling is driven by actual location data obtained using radio-telemetry information, informed by >31,000 telemetry locations from >1,500 radio-marked sage-grouse across 12 study areas within Nevada and California collected over a 15-year period, and by environmental factors including land cover composition, water resources, habitat configuration, elevation, and topography, each at multiple spatial scales that are relevant to sage-grouse movement patterns. The modeling process contrasted these environmental factors for sites used by sage-grouse (telemetry data) with available sites (randomly generated locations). Contrasting the environmental factors of used versus available sites provided information about what factors were correlated with greater sage-grouse selection or avoidance (e.g., streams, pinyon-juniper).

RSFs were applied to calculate an overall probability of use per pixel[2]. This created a single sage-grouse HSI and resulted in a surface of predicted use by sage-grouse across Nevada. This surface, the HSI, is represented by probability values that range across a continuous spectrum of 0.0 to 1.0 (Figure 5).

Habitat Suitability Categories

To identify suitable habitat, the HSI described above was classified into three categories of suitability (high, moderate, and non-habitat) using cutoff values based on the standard deviation (SD) from the mean HSI ($\bar{x}$) value. High suitability habitat was comprised of all HSI values greater than 0.5 SD below $\bar{x}$. Moderate suitability habitat was comprised of HSI values between 1.5 and 0.5 SD below $\bar{x}$. Non-suitable habitat was comprised of HSI values 1.5 SD below $\bar{x}$. This bottom cut-off point was validated by a cost-benefit ratio looking at the trade-off between additional area to telemetry points. The equalization

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[2] Pixels are the 30 x 30 meter resolution of the RSFs.

point occurs at 1.5 SD. The resulting habitat categories were then aggregated at the 1 km scale to account for corridors and smoothed at the 1.2 km scale to remove "islands" (Figure 3).

Space use index

An index of space use was developed based on lek attendance and density coupled with probability of sage-grouse occurrence relative to distance to nearest lek. This index was then categorized into two categories: high use and low to no use. High use consisted of areas that included up to 85 percent of the highest space use index density and low-to-no use consisted of areas with less than 15 percent.

Management Categories

To create a management prioritization for the implementation of this State Plan, the habitat suitability classes were intersected with the space use categories as follows:

> **Core Management Areas** – areas of suitable sage-grouse habitat that are found within areas of estimated high space use;
>
> **Priority Management Areas** – high suitability habitats that are found in areas of estimated low space use and areas of non-habitat that overlaps with areas of estimated high space use;
>
> **General Management Areas** – moderate suitability habitats that are found in areas of estimated low space use; and
>
> **Non-habitat Management Areas** – non-suitable habitats that are found in areas of estimated low space use (Figure 4).

Full methods for the development of the Nevada HSI, Habitat Suitability Map, and Management Category Map are detailed in "Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management" (Coates et al. 2014).

The Nevada sage-grouse habitat and management mapping process is a product of the SETT and is a collaborative group process with state and federal agency review and input and with the USGS serving as the scientific contractor on the habitat suitability model.

Map revisions

This mapping effort is iterative and is intended to inform and better define aspects of the State Plan. To that end, the habitat and management mapping process will be reviewed and refined every 3 to 5 years. New or improved spatial data (*e.g.*, additional sage-grouse telemetry data, updated or improved vegetation community data) will be incorporated during the refinement process. The review and refinement process will be scientifically based and include review and input from SETT, NDOW, BLM, USFS, and USFWS. Other stakeholders will be encouraged to participate in the process by submitting relevant information to the listed agencies. It is anticipated that the habitat suitability modeling processes will be the basis for refinements, unless more rigorous methods are developed.

Project assessment under SETT Consultation will be based on the map that is current at the commencement of the review process. If a new map becomes available after the review process has begun, the previous version of the map will continue to be used. If the project proponent proposes changes in scope of the project, then the assessment will be based on the revised map. In addition, individual projects will typically include on the ground habitat determinations for the presence or absence of habitat.

7.0 THREAT ASSESSMENT—GOALS, OBJECTIVES, AND MANAGEMENT ACTIONS

Threats to sage-grouse and their habitats in Nevada were based on those identified in USFWS' 2010 proposed rule for sage-grouse and further developed in their Conservation Objectives Team Report, as well as from input by local areas experts. The list of threats and proposed actions was originally determined by the Advisory Committee and further developed in greater detail by the SEP.

7.1 Fire and Invasive Plants

In 2012, Nevada's Greater Sage-grouse Advisory Committee, using the best available science, identified fire and invasive plants, principally cheatgrass, as the primary threat to sage-grouse and their habitat in the state of Nevada. Wildland fires and the subsequent invasion or potential domination by cheatgrass and other invasive plants continue to create large-scale habitat loss and fragmentation (Figure 6 and Figure 7). This current rate of habitat loss is not sustainable for long-term sage-grouse population persistence.

While the vast majority of fires in sage-grouse habitat are suppressed in the initial attack phase, the continued loss of large areas in sage-grouse habitat occurs most often during periods of 'Extreme Fire Danger Conditions' when fire behavior has the greatest impact on suppression capabilities. These 'Extreme' conditions can exist simultaneously over large areas of the western U.S, creating a shortage of regional/national firefighting assets due to pre-existing large fires with greater values at risk (Murphy et al. 2013).

In Nevada and throughout the western United States, the years in which the highest number of acres burned occurred after wet productive growing seasons that produced abundant fine fuels. Consecutive wet years can add to residual fine fuels. An unprecedented series of four wet years in 1995-1998 was followed by an unprecedented three years in 1999-2001 during which more than 2.75 million acres burned in Nevada (Littell et al. 2009). Woody fuels become most flammable when lack of fire or a fire surrogate vegetation management allows woody fuel to accumulate. Many areas of Nevada that prehistorically burned every few decades have not burned for over a century (Gruell and Swanson 2013).

The State acknowledges these threats must be adequately addressed in order to achieve the conservation goal for sage-grouse and actions must be taken to increase overall preparedness, strategically locate fuels management projects using resistance and resilience concepts (Chambers et al. 2014), increase local suppression capabilities, and improve rehabilitation/restoration capabilities.

To this end, the State has begun to address these threats by creating the Sagebrush Ecosystem Program, composed of the Sagebrush Ecosystem Council, with its attendant Sagebrush Ecosystem Technical Team, to develop and approve a state plan that facilitates best available science review and technology transfer to State and local agencies and to work in coordination with federal land managers and other public and private partners. In addition, the State has also approved and is implementing the Nevada

Division of Forestry's (NDF) Wildland Fire Protection Program, which allows for full implementation of Nevada Revised Statute, Chapter 472, improving delivery of financial, technical and wildland firefighting equipment/human resources to Nevada counties in fuel reduction planning and implementation, wildfire management and suppression and short and long term restoration of burned areas.

As well, the SAP, to be developed subsequently to this State Plan, will draw on concepts of resistance and resilience as a multi-scale approach to prioritize management actions for sage-grouse. Chambers et al (2014) outlines the role of these concepts relative to fire cycle and the role of annual invasive grasses. The SETT will participate in the interagency collaborative Fire, Invasive Assessment Team (FIAT) that has developed a step-down process (FIAT 2014) based on Chambers et al. 2014 to identify management projects focused in key sage-grouse habitat to address the continual threat of fire and invasives, as well as conifer encroachment. Projects identified through the FIAT will be incorporated into the SAP, as appropriate.

Nevada Revised Statute (NRS) Chapter 555 and Nevada Administrative Code (NAC), Chapter 555 address both noxious and invasive plants, their status, and any regulations regarding the control of such plants. The State has established a priority list of noxious weeds that require some form of control. Other widespread invasive plants, such as cheatgrass, while not on the noxious weed priority lists, pose a significant threat to Nevada's landscapes and habitats and will be addressed on a priority basis, particularly when they compromise sage-grouse desired habitat conditions (see Section 4.0).

The introduction of exotic invasive plant species in Nevada has likely been occurring since the early European settlers arrived and has been intentionally and unintentionally occurring since that time. While some species may go seemingly unnoticed, many currently pose significant threats to the sagebrush ecosystem, wildlife habitats, and our landscape in general. While all of these identified species are currently considered by the State as invasive plants, some warrant further declaration as 'noxious'. Noxious weeds are defined in NRS 555.130 as: "Any species of plant which is likely to be detrimental, destructive or difficult to control, but is not already introduced and established in the State to such an extent as to make its control or eradication impracticable in the judgment of the State Quarantine Officer". Plants that do not meet this definition are generally considered to be invasive or nuisance weeds. Cheatgrass falls into the 'invasive' category due to its expansive footprint within Nevada's sagebrush ecosystem.

Cheatgrass is an exotic species from the Middle East that was introduced in North America in the late nineteenth century and has become one of the most adaptive and dominant invasive plants in the Western U.S. This is especially true following fire and other major ground disturbing activities in sagebrush ecosystems, particularly at lower elevations and precipitation zones in Nevada.

Many factors will be considered when prioritizing treatments for fire and invasive plants (i.e. noxious weed presence, sage-grouse breeding densities, habitat suitability (abundance, quality, and connectivity), existing additional threats, resistance, resilience, ecological site description, state and transition models, etc.). Additionally, further prioritization may be determined by the type of action required (conservation related, prevention based, or restoration or rehabilitation activities), presence of or proximity to sage-grouse habitat, and the amount of funding available for treatment in a given year.

Goals, Objectives, and Management Actions

The overarching direction of Nevada's plan is to stop the decline of sage-grouse populations and restore and maintain a functioning sagebrush ecosystem. Currently, it is not economically or ecologically feasible to restore all fire damaged or invasive plant dominated landscapes, nor is it possible to prevent all fires, though the State acknowledges that this threat must be addressed in order to provide for the conservation of sage-grouse. In order to achieve this goal, the State will take a phased approach through a series of short term and long term objectives and management actions. The State will first seek to reduce the amount of habitat loss, with the long-term objective of restoring ecosystem functions and processes. This will require a concerted and consistent commitment to achieve these objectives over the long-term.

The State has already taken steps to achieve these objectives through statewide adoption and implementation of the Nevada Division of Forestry's Wildland Fire Protection Program, creating a tiered system that gives equal priority to cooperative pre-suppression fire prevention projects; adopting and incorporating National Wildfire Coordination Group (NWCG) approved training and firefighting techniques that can help preserve habitat; and, cooperative post-suppression rehabilitation and restoration activities in and around areas of important habitat.

Goal 1: Ameliorate the threat of fire and invasive plants in order to provide for the conservation of sage-grouse and their habitat.

Short term objectives and management actions:

Objective 1.1: Reduce the amount of sage-grouse habitat loss due to large acreage wildfires and invasion or potential domination by non-native plants.

Pre-suppression

In order to address the threat of fire and invasive plants, which continues to challenge land managers throughout the western United States, the State proposes a paradigm shift. This entails a shift in focus from the current suppression-centric approach to a more nuanced, cost effective, and proactive approach focusing on pre-suppression activities; which if adequately supported, will contribute greatly to Federal, State and local efforts to stop the dominance of invasive plants, reduce catastrophic wildfire incidence, and restore fire to within a range of variability to support sustainable populations of sage-grouse in Nevada.

Management Action 1.1.1a: Develop, and provide sustainable, predictable federal, state, and local funding sources for pre-suppression activities (including maintenance) separate from funding for suppression and post-fire rehabilitation activities.

Management Action 1.1.1b: Dedicate funding to plan and implement cost effective pre-suppression activities with an emphasis on strategic, scalable cooperative projects informed by best available science; utilize cost efficient methods and tools; and follow up with effective, repeatable monitoring.

Management Action 1.1.1c: Make decisions regarding pre-suppression planning and fuels management projects based on best available science. This information will be incorporated into the planning process to inform locations of landscape and local scale fuels management projects and to provide protection to areas of sage-grouse habitat that have compromised resilience, resistance, and heterogeneity.

Management Action 1.1.1d: Prioritize pre-suppression fuels management projects, fire prevention planning, and invasive plant control activities in and around Core and Priority Management Areas. Pre-suppression projects will be identified, designed and prioritized so that they facilitate firefighter safety, protect private property, prioritize important sage-grouse habitat, and work to maintain natural resource functions.

Management Action 1.1.1e: Establish, maintain, and fund an effective, repeatable pre-suppression monitoring and adaptive management program that informs future project planning and implementation.

Suppression

State and federal agencies will provide safe, cost-effective fire management programs that support the conservation of sage-grouse habitat through collaborative planning, coordination, training, staffing, resource allocation, and fire management oversight.

Management Action 1.1.2a: Support robust, coordinated, and rapid fire suppression management using a diversity of agencies, including federal, state, tribal and local government, as well as creating, empowering and training (to latest Nevada and National Wildfire Coordinating Group (NWCG) standards) Rural Fire Associations, Fire Protection Districts and Wildfire Support Groups.

Management Action 1.1.2b: Support and improve interagency wildfire prevention activities and education statewide, including: interagency agreement updates, wildfire workshops, demonstration projects, and public service announcements on wildfire and sage-grouse habitat loss.

Management Action 1.1.2c: When prioritizing wildland firefighting actions in the Sage Grouse Management Area (SGMA), give priority to Core Management Areas, followed by Priority and General Management Areas during fire operations.

Management Action 1.1.2d: Use wildland fire strategically to accomplish resource management objectives. Fire may not have to be suppressed in all instances. Resource and fire managers should consider beneficial fire use if located in areas that may benefit sage-grouse habitats, but only if:

- it would not risk the net spread of invasive plants;
- human lives, property, and important natural resource functions are not at risk;

- wildland fires exhibit prescribed/desired fire behavior characteristics and are located in designated sage-grouse habitats appropriate for beneficial fire use.

Management Action 1.1.2e: Manage wildland fires in sage-grouse habitat to retain as much habitat as possible. Interior unburned islands of vegetation in areas of habitat should be protected through follow-up mop-up of the island's perimeter and interior, when fire crew safety is not at risk.

Post-Fire Restoration/ Rehabilitation

Emergency stabilization (ES) and burned area rehabilitation (BAR) funding streams are instrumental in the process of stabilizing soils and reestablishing adapted perennial vegetation on federal lands post-fire. Currently, these programs provide funding for rehabilitation treatment immediately post-fire, which does not reflect the need to accommodate for poor initial success due to lack of precipitation and other environmental variables.

Management Action 1.1.3a Work with federal, tribal, and local governments to develop dedicated funding sources that allow for up to five years of additional post-fire restoration treatments in order to better ensure projects meet goals and objectives.

Management Action 1.1.3b Until such time as dedicated funding sources for multi-year post-fire restoration treatments can be developed, federal, state, tribal, and local governments should submit budget requests and projections that reflect the need for funding that will cover actual and contingent yearly costs associated with successful multiyear post-fire rehabilitation efforts.

Management Action 1.1.3c: Use the concepts of resistance and resilience and products developed by BLM's FIAT (Fire and Invasives Assessment Team) group to determine if post-fire restoration actions are necessary to trend towards sage-grouse desired habitat conditions (see Section 4.0).

Management Action 1.1.3d: Control the spread of invasive plants post-fire.

Management Action 1.1.3e: Use collaborative and strategic approaches in post-fire rehabilitation efforts in sage-grouse habitat. Federal, state, tribal and local agencies should coordinate and collaborate on rehabilitation projects in sage-grouse habitat where responsibilities and land ownership interests intersect.

Management Action 1.1.3f: Design post-fire restoration treatments in Core, Priority, and General Management Areas to trend towards sage-grouse desired habitat conditions (see Section 4.0). Consider the use of native plant materials based on availability and probability of success. When native plant materials are not available or the probability of success is low, use non-native plant materials that will best work towards achieving sage-grouse desired habitat conditions. All seed used on rehabilitation and restoration projects must be labeled source identified or certified seed, as appropriate. All mulch, straw or gravel/earth materials used in rehabilitation and restoration projects must be certified weed free to the North American Invasive Species Management Association (NAISMA) standards.

Management Action 1.1.3g: Monitor post-fire restoration treatments to ensure long term persistence of restored habitat, and that the monitoring continues at least until treatment objectives are met.

Invasive plants

While wildfire is commonly the facilitator for the domination of invasive plants, such as cheatgrass, invasive plants are currently widespread throughout the Great Basin and can spread without the aid of wildfire. In order to address the general threat of invasive plants, the State will pursue a strategy of Prevent, Detect, Control, Restore, and Monitor, using the best available science. The Nevada Department of Agriculture (NDA) will utilize its EDDMapS program to assist the State in the implementation of these efforts.

Management Action 1.1.4a**:** *Prevent* the establishment of invasive plants into uninvaded sage-grouse habitat. This will be achieved by conducting systematic and strategic detection surveys, data collection, and mapping of these areas and engaging in early response efforts if invasion occurs. This will be achieved by further developing federal and state partnerships and working with counties, cities, and local groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts. This is a priority for invasive plant control in the state of Nevada.

Management Action 1.1.4b: Apply Design Features to proposed anthropogenic disturbance (see Appendix A) in order to minimize land disturbance and prevent the spread of invasive plants.

Management Action 1.1.4c: Require anthropogenic disturbance proponents to monitor for the existence of invasive plants pre-disturbance and to report all findings to the NV EDDMapS database. Pre- and post-disturbance activities must include prevention strategies prior to entering sites, control, restoration, and monitoring for a minimum of three years or until the site is deemed noxious and invasive weed free following the disturbance. All sites must be certified weed free prior to any relinquishment of obligations that authorized the disturbance.

Management Action 1.1.4d: *Detect* new invasive plant infestations, whether it is a single plant or a small patch. If it can be detected and mapped early in the invasion and control begins immediately, then the likelihood for eradication will increase dramatically. NDA will use its EDDMapS program to assist in the effective and efficient implementation of this action.

Management Action 1.1.4e: Within sage-grouse habitat, and where funding may be a limiting factor, prioritize the control of invasive plants that are compromising attainment of sage-grouse desired habitat conditions (see Section 4.0).

Management Action 1.1.4f: Rehabilitate sites that are ecologically functioning, but at risk of crossing an ecological threshold and becoming nonfunctional due to already being compromised by invasive plants, to trend towards sage-grouse desired habitat conditions(see Section 4.0). Rehabilitation may include re-vegetating sites with native plants cultivated locally or locally adapted, or non-native plant species where appropriate. Any rehabilitation project where invasive plants already occur or may be found in close proximity should include an invasive plant treatment and monitoring component within the plan.

Management Action 1.1.4g: Use ecological site descriptions and associated state and transition models to identify target areas for resiliency enhancement or restoration. Maintaining or enhancing resilience should be given top priority. In the Great Basin sagebrush-bunchgrass communities, invasion resistance and successional resilience following disturbance are functions of a healthy perennial bunchgrass component. Therefore a combination of active and passive management will be required to ensure this functionality. Areas that are in an invaded state that will likely transition to an annual grass monoculture if a disturbance occurs and are located within or near sage-grouse habitat should be prioritized for pre-fire management favoring native and adapted perennials and post-fire restoration efforts to increase resistance and resilience.

Management Action 1.1.4h: Engage climatological and meteorological professionals and their agencies to identify opportunities to increase both effectiveness and efficiency in the timing of restoration activities. Additional activities could include weather augmentation through cloud seeding, and assistance with both short term and longer term weather prediction model guidance or shorter term weather indicators.

Management Action 1.1.4i: Monitor and adaptively manage to ensure effectiveness of efforts to prevent, detect, control and restore. Use the resource mapping functions within EDDMapS to identify and map infestations as well as any prevention, restoration, or rehabilitation efforts.

Long term objectives and management actions:

Objective 2a: Maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of non-native species and resilient after disturbances, such as wildfire.

Objective 2b: Restore wildfire return intervals to within a spatial and temporal range of variability that supports sustainable populations of sage-grouse and other sagebrush obligate species.

Management Action 1.2.1 Develop consistent and dedicated funding sources in order to provide a consistent commitment to pre-suppression, suppression, post-fire restoration, and invasive plant management actions described above.

Management Action 1.2.2: Work collaboratively with federal, state, tribal, and local governments, as well as private entities to consistently implement the management actions described above.

Management Action 1.2.3: Monitor all management actions to evaluate and assess their effectiveness at achieving objectives and use this knowledge to adapt management plans.

Management Action 1.2.4: Emphasize continued research and provide funding for research and monitoring to enhance knowledge and understanding of how to further reduce the prevalence of catastrophic wildfire. Minimize the risk of crossing ecological thresholds due to the invasion and subsequent potential domination by invasive annual grasses, use fire behavior prediction to optimize fire management, and improve rehabilitation/ restoration techniques.

7.2 Pinyon-Juniper Encroachment

In Nevada, pinyon and juniper (P-J) woodlands are composed of single leaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) (Figure 8). In northwestern Nevada pinyon and Utah juniper are replaced with western juniper (*J. occidentalis*). P-J woodlands currently cover 13% of Nevada, or approximately 9.1 million acres (Mitchell and Roberts 1999). Of the 9.1 million acres in Nevada, approximately 64% is found on BLM land, 26% on USFS land, 5% on private land, and the remaining 5% on other lands (DOD, NRC, USFWS, BIA, etc.)(DCNR-NDF 2010).

From a historical standpoint, the area occupied by pinyon or juniper has increased 125 to 625 percent since 1860. The increase in trees is a result of infill into shrub-steppe communities that contained low numbers of trees, and expansion of P-J into areas that previously did not support trees. (Miller et al. 2008). Potential reasons for the expansion may include: altered fire regimes, improper livestock grazing, natural range expansion, and changing climate (Romme et al. 2009).

In Nevada, P-J encroachment is ranked as the second highest threat to sage-grouse, after fire and invasive plants. This continued woodland expansion is a challenge for land and wildlife managers, with two primary concerns being the continuing steady conversion of sagebrush habitat to woodland and increased risk of large area destructive wildfires that may convert woodlands to monocultures of invasive annual grasses and other weedy species.

Pinyon – Juniper Woodland Encroachment into Sagebrush Communities – Characterization
P-J woodland encroachment is characterized by three phases (Miller et al 2005):

- Phase I – Trees are present but shrubs and herbaceous vegetation are the dominant vegetation that influences ecological processes on the site;
- Phase II – Trees are co-dominant with shrubs and herbaceous vegetation and all three vegetation layers influence ecological processes on the site; and
- Phase III – Trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site.

If a wildfire occurs before Phase III is reached, the original vegetation community has an opportunity to return to the site via successional pathway that is dependent upon the fire's surviving plant species, seed produced by the remaining shrubs, surviving herbaceous vegetation, or their viable seed remaining in the soil seed bank. This return to the original community is also dependent on the native plants being abundant enough to out compete any on-site invasive annual grasses like cheatgrass or medusahead grass (*Taeniatherum caput-medusae*) and perennial invasive weeds (e.g. knapweeds, etc.) following the fire.

With time, and little or no fire, these invaded brush communities become Phase III woodlands, characterized by very little understory, the only evidence of the former plant community being skeletons of sagebrush and other woody brush species and a sparse population of weakened herbaceous plants . At this point, run-off from the soil surface of spaces between trees increases, due to the loss of herbaceous ground cover. In turn, the increased rate and speed of soil erosion can trigger difficult to reverse changes to the biogeochemical cycles of the plant community. If a fire burns through the woodland at this point, the potential for the area to return to a sagebrush plant community is greatly reduced, particularly if cheatgrass, medusahead, or perennial invasive weeds are present in the understory.

The risk of conversion to annual and perennial invasive plants increases as trees grow from phase II to phase III, with the threshold occurring at about >40% relative cover of trees compared to <60% cover of shrubs and herbaceous plants. Prior to this threshold, fire sustains long-term sagebrush ecosystem resilience. After this threshold, fire leads to potential domination by invasive annuals or perennials without effective re-vegetation by perennial grasses (Miller et al. 2005).

In the Great Basin there are approximately 100,000 + acres a year moving into Phase III woodlands. (Miller et al.2008). At this rate of encroachment, management of sagebrush habitats becomes a race between a potentially permanent loss of sagebrush habitat to P-J woodland versus how much Phase I and II woodlands can reasonably be treated each year before they reach Phase III.

Land managers have to consider removal of trees from areas that historically have been sagebrush dominated as a priority activity. Numerous studies have documented the expansion of P-J woodlands into sagebrush communities (Cottam and Stewart 1940; Adams 1975; Burkhardt and Tisdale 1976; Tausch et al. 1981; Tausch and West 1988, 1995; Gedney and others, 1999; Miller and Rose 1995, 1999; Miller et al. 2005). In recent years, research has looked at woodland dynamics and new approaches to measure the extent that P-J has replaced or are encroaching sagebrush communities, versus dynamics on sites that have supported woodlands in the past (Miller et al.2008).

Another area of recent research increasing land managers understanding of vegetation dynamics and increasing decision making options is the inclusion of concepts of resistance and resilience. These concepts can be used in conjunction with sage-grouse habitat requirements to develop lists of appropriate management actions and to identify effective management strategies at landscape scales (Wisdom and Chambers 2009 & Chambers et al. 2014).

Pinyon – Juniper Woodland Encroachment into Sagebrush Communities – Greater Sage-grouse Impacts

The continued expansion of woodland has become a primary threat to greater sage-grouse and other sagebrush obligate wildlife species. In the instance of sage-grouse, woodland expansion contributes to the loss of important seasonal habitats. It also increases raptor presence and predation associated with the coniferous trees (Commons et al. 1999). Several studies demonstrate that sage-grouse avoid areas encroached by P-J, show that P-J removal will increase sage-grouse habitat quality, and provide some evidence that sage-grouse will return to an area once P-J is removed:

- During both the breeding and summer seasons, sage-grouse preferred cover types with less than 5% juniper canopy cover compared to those same cover types with greater than 5% juniper canopy cover. (Freese 2009).

- Juniper can also indirectly influence sage-grouse avoidance of habitats through its influences on plant community compositional and structural changes, such as a reduction in the herbaceous understory (Knapp and Soule 1998, Miller et al. 2000).

- Sage-grouse avoided conifers at the 0.65 km scale (850m x 850m). Sage-grouse avoided mixed sagebrush/tree (≤40 trees/ha) at scales of 7.3 and 159.2 ha. Avoidance was most statistically supported when patch widths exceeded 200 m (Doherty 2008).

- Sage-grouse avoid areas encroached by P-J at scales of 7.9 ha to 226.8 ha (Casazza et al 2011).

- Recent modeling efforts by the Sage-grouse Initiative have shown that no leks remained active when P-J cover exceeded >4% and recommended focusing P-J removal treatments in Phase I stands (Baruch-Mordo et al 2013).

- Research focused on treatment effectiveness indicated that mechanical tree thinning increased native understory biomass by 200 percent (Brockway et al 2002).

- Removal, by cutting, of pinyon- juniper trees/shrubs in association with brush-beating to reduce height of mountain big sagebrush and deciduous brush resulted in doubling numbers of male sage grouse counted on treatment leks in years 2 and 3 post-treatment (Commons 1999).

Goals, Objectives, and Management Actions

Goal 1: Establish and maintain a resilient sagebrush ecosystem and restore sagebrush vegetation communities in order to provide for the conservation of sage-grouse and their habitat.

Objective 1.1: Reduce the expansion of P-J woodlands into otherwise suitable sage-grouse habitat.

Management Action 1.1.1: Inventory and prioritize areas for treatment of Phase I and Phase II encroachment that is contiguous with suitable sage-grouse habitat in Core, Priority, and General Management Areas in order to achieve sage-grouse desired habitat conditions (Table 4.1). Treat areas that have the greatest opportunity for recovery to suitable sage-grouse habitat based on ecological site potential.

Management Action 1.1.2: Prioritize areas for treatment of Phase III pinyon-juniper encroachment in strategic areas only to break up continuous, hazardous fuel beds, create movement corridors, or connect habitats. Treat areas that have the greatest opportunity for recovery to suitable sage-grouse habitat based on ecological site potential. Old growth trees should be protected on woodland sites.

Management Action 1.1.3: Aggressively implement plans to remove Phase I and Phase II encroachment in areas contiguous with suitable sage-grouse habitat. Only treat areas in Phase III encroachment to reduce the threat of severe conflagration, create movement corridors, or connect habitats. Phase III treatments may need additional rehabilitation/restoration actions if perennial understory vegetation is absent.

Management Action 1.1.4: Allow temporary road access to P-J encroached treatment areas. Construct temporary access roads where access is needed with minimum design standards to avoid and minimize impacts. Remove and restore temporary roads upon completion of treatment.

Management Action 1.1.5: Seek sufficient resources to address habitat loss and degradation in the next ten years.

Management Action 1.1.6: Share project funding among all appropriate agencies and jurisdictions by designing and completing NEPA for large-scale, watershed-based treatments over a period of years.

***Management Action 1.1.7*:** Incentivize and assist in the development of bio-fuels and other commercial uses of pinyon and juniper resources, where utilization is appropriate and can expand site-specific restoration and rehabilitation goals and objectives

Management Action 1.1.8: Increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years.

Management Action 1.1.9: Work with federal, state, local, tribal, and private partners to treat at least 100,000 acres annually. Monitor, adaptively manage, and report progress to the Nevada Sagebrush Ecosystem Council.

Management Action 1.1.10: Use pre-suppression fuels management treatments in strategic areas so fire in P-J areas can be managed appropriately.

Management Action 1.1.11: Work with federal, state, and local fire management partners to pre-plan for fire use and prescribed natural fire where and when appropriate.

7.3 Predation

Predation is a natural factor operating on all sage-grouse populations. Historically, given appropriate quality and quantity of habitat, sage-grouse populations have persisted despite naturally high levels of predation with which they evolved (Schroeder and Baydack 2001, Hagen 2011). Prey species have evolved ways to avoid predation such as coloration that conceals them, behavioral adaptations, and specialized reproductive strategies. Sage-grouse populations typically mitigate impacts of predation through cryptic nesting, increased chick production, re-nesting efforts, and response to annual habitat variation. When population levels become depressed below a particular threshold, quantity and quality of habitat may be diminished, or predator populations may become abundant enough to serve as a limiting factor, the behaviors and life-history strategies of prey species may not be able to compensate for losses from predators depending on numerous factors influencing predator densities and effects. These factors include: predator search efficiency, prey switching, and food subsidies (Cote and Sutherland 1997, Schroeder and Baydack 2001, Hagen 2011).

Predator Species

Predators can affect sage-grouse during various life stages in three ways: 1) nesting success, 2) survival of chicks during the first few weeks after hatch, and 3) annual survival of breeding age birds (Schroeder and Baydack 2001). Table 7-1 outlines potential predator species in Nevada that may influence each life stage.

Table 7-1 Potential Sage-grouse Predator Species in Nevada

	Life Stage		
Predator Species	**Nest**	**Chick**	**Juvenile and Adult**
American badger (*Taxidea taxis*)	X		X
Bobcat (*Lynx rufus*)	X		
Coyote (*Canus latrans*)	X		X
Fox (*Vulpes* spp.)	X		
Great Basin gopher snake (*Pituophis catenifer*)		X	
Raptors (*Buteo* spp., *Aquila* spp. *Circus* spp, etc.)			X
Common raven (*Corvus corax*)	X	X	
Weasels (*Mustela* spp.)	X	X	

(Connelly et al. 2004, Coates et al. 2008, Lockyer et al. 2013)

None of these predators depend on sage-grouse as their primary prey species. Many depend primarily on rodents or lagomorphs but will opportunistically consume sage-grouse, especially during specific life phases (e.g. badgers during the nesting season (Coates and Delehanty 2010)).

The common raven (*Corvus corax*) is identified as the most frequent predator during nesting season in sage-grouse predator studies conducted recently in the Great Basin (Coates et al. 2008, Lockyer et al. 2013). Raven populations have increased over 200 percent from 1992 to 2012 in both the Great Basin and in Nevada, based upon USGS Breeding Bird Survey results (Sauer et al. 2014). Subsidized food sources such as landfills and road kill; elevated nest platforms provided by transmission lines; and landscape alterations such as transitions to annual grasses, can increase raven populations (Boarman 2003, Boarman and Heinrich 1999, Webb et al. 2004). Raven abundance is often tied to habitat quality, particularly in areas where recently burned areas abut unburned habitat (Howe et al. 2014, Coates et al., In Review). Raven control has been shown to be an effective, short-term, tool during the early nesting season to gain increased survival through the nesting and early brood life cycle stages (Coates et al. 2007) when ravens are the limiting factor affecting nest success. Long-term effects at the population level are still not understood.

Given that ravens have been found to be increasing across the West and juvenile survival of ravens is tied to anthropogenic subsidies (Webb et al. 2004), localized lethal efforts are not likely to be successful in reducing state-wide populations (Webb et al. 2004). Thus, effective raven management needs to also include efforts to reduce food, water, and nesting subsidies.

Current State Predation Management Efforts for Sage-grouse

The following presents information on the State of Nevada's current predator control efforts to benefit sage-grouse populations.

Predator control
NDOW is partnered with USDA-APHIS-Wildlife Services for predator control focusing on carnivores (primarily badgers and coyotes) and ravens. NDOW currently has a depredation permit from the FWS for 2,500 ravens. Much of the take under this permit is conducted using poisoned eggs (hard-boiled chicken eggs that contain DRC-1339, an avicide). Poisoned eggs are placed at specific leks for ravens as a means of limiting raven populations during the sage-grouse nesting season. (See Appendix D for additional details regarding FWS depredation permits for ravens.)

Road kill removal
In cooperation with NDOT, county road crews, USFWS, and UNR, NDOW has hired wildlife technicians to experimentally remove road carrion from three treatment areas in northern Nevada, in and around priority sage-grouse nesting habitat.

Landfill management
NDOW is working in cooperation with city and county municipalities, private entities, and the USFWS in Eureka, Humboldt, and Lander Counties to improve waste stream policies to minimize access by predator species and to increase the frequency of food waste and dead animal pit burials.

Goals, Objectives, and Management Actions

Goal 1: Reduce sage-grouse mortality due to predation where predation mortality is likely additive or is a limiting factor influencing sage-grouse population.

The following three objectives should be carried out concurrently as part of an integrated predator management plan.

The management actions identified under Objective 1.1 should be carried out at the state-wide level, or at a more localized, targeted scale, as appropriate.

Objective 1.1: Reduce anthropogenic subsidies to ravens, such as food sources (e.g. road kill, landfills), and nesting substrates (e.g. power lines), especially cognizant in landscapes with heterogeneous land cover, such as burned and unburned areas.

Management Action 1.1.1*:* Coordinate with NDOT and local governments to identify high density road kill areas to focus interagency road kill removal efforts. Provide information to agency staff that explains the need for the effort and outlines disposal options and procedures.

Management Action 1.1.2*:* Work with city and county governments to develop and adopt procedures that minimize availability of refuse in the urban interface that acts as food and water sources for predators.

Management Action 1.1.3*:* At landfills and waste transfer facilities, work with Nevada Division of Environmental Protection and facility managers to develop and adopt procedures that eliminate food and water sources for predators.

Management Action 1.1.4*:* Work with livestock owners, land managers, and regulatory authorities to develop and implement effective methods to reduce or eliminate exposed animal carcasses or other livestock by-products that may provide a food subsidy for predators.

Management Action 1.1.5*:* Collaborate with and provide informational material to stakeholders, such as Nevada Association of Counties, League of Cities, sportsmen's groups, Nevada Cattlemen's Association, and the general public on raven subsidy issues; such as refuse in urban areas, livestock carcasses and by-products, and wildlife carcasses (coyote, squirrels, rabbits).

Management Action 1.1.6*:* Research and develop management techniques to limit or reduce the availability of water subsidies to ravens. This may be very challenging and will likely require new technologies and techniques given Nevada's arid environment, distance between natural water sources, and the need for anthropogenic watering sites accessible to both livestock and wildlife.

Management Action 1.1.7: Reduce and eliminate artificial hunting perches and nesting substrate for aerial predators (e.g., removal of non-operational fences and power lines, installation of anti-perch devices on new power lines). Consideration for retrofit of existing power lines can be done on a case by case basis, where technology and economic factors allow.

Management Action 1.1.8: Encourage continued research in the development of more effective perching and nesting deterrent options.

Management Action 1.1.9: Monitor the effects of efforts to reduce anthropogenic subsidies on raven populations and adapt management accordingly.

Objectives 1.2 and 1.3 should be implemented in localized areas where predation has been identified as a limiting factor on sage-grouse population. Use the "Process to Prioritize Integrated Predator Management Projects" (See Appendix E) before engaging in Objectives 1.2 and 1.3.

Objective 1.2: Maintain or improve habitat integrity by increasing visual cover to reduce detection by predators or by reducing fragmentation to limit habitat for ravens.

Management Action 1.2.1: Maintain a mosaic of shrub cover conditions with areas of nesting habitat having ≥20% sagebrush cover and ≥30 percent total shrub cover to provide increased cover for nesting and escape (Gregg et al. 1994, Coates and Delehanty 2010) and decrease opportunities for large fires using pre-suppression strategies.

Management Action 1.2.2: Maintain residual grass cover in nesting habitat to provide cover for nesting and escape (Gregg et al. 1994, Gregg and Crawford 2009, Coates and Delehanty 2008). This factor is more important if shrub cover is low.

Management Action 1.2.3: Where appropriate, begin recovery of degraded sites to reduce fragmentation by decreasing edge of non-native annual grasses next to intact Core or Priority Management Areas and to reduce fragmentation.

Management Action 1.2.4: Minimize disturbance activities near leks during lek season (i.e., when males are inattentive and most vulnerable to predation) and near nest sites during nesting season that may result in adults flushing off nests or away from young. (In this instance, disturbance activities are anything that may cause birds to flush such as startling noise [explosions], road traffic, human presence, etc.). Use seasonal restrictions on activities, when appropriate, to minimize disturbances.

Objective 1.3: Conduct targeted predator control, based on monitoring and adaptive management. Objective 1.3 should be implemented pursuant to steps to achieve objectives 1 and 2.

Management Action 1.3.1: From the outcome of the Process to Prioritize Integrated Predator Management Projects (see Appendix E), establish a predator control program based on biological assessments appropriate to local conditions. Conduct predator control to coincide with the life stage impacted by predation. Program development needs to include specific goals and objectives and identification of triggers or endpoints for management practices. Monitor pre- and post-treatment predator numbers or densities as appropriate, and effects of predator control on sage-grouse vital rates (e.g. nest success, chick survival) and adapt control strategies accordingly.

Management Action 1.3.2: When conducting raven control programs using DRC-1339, the methods outlined in Coates et al. (2007) should be followed. The following points should be evaluated when conducting raven control programs:

- The assumed ratio of number of ravens removed to baited eggs placed
- Need for pre-baiting to accustom ravens to their presence
- Length of time eggs should be left in the environment
- Spacing of egg and number of eggs placed together
- Consideration to implement treatment yearly, based on monitoring of raven population response
- Treatment should be conducted early in sage-grouse incubation period (within the first 40 days following first average nest initiation for the season) to coincide with greatest raven predation period (Coates and Delehanty 2008, Lockyer 2013)

The SETT will work with subject experts (USGS, NDOW, Wildlife Services) to develop a standardized protocol for effective raven removal efforts.

Management Action 1.3.3*:* Consider option to oil or addle eggs in nests of territorial ravens found on anthropogenic structures as part of raven control program, when appropriate.

Management Action 1.3.4: Document success through a rigorous monitoring, analysis, and reporting of population responses to control efforts. For raven control programs, if there is a demonstrated benefit to sage-grouse via scientifically valid documentation, submit a request to USFWS for increased allowable take of ravens, assuming personnel availability from NDOW and Wildlife Services to appropriately identify locations and conduct work.

7.4 Wild Horses and Burros Management

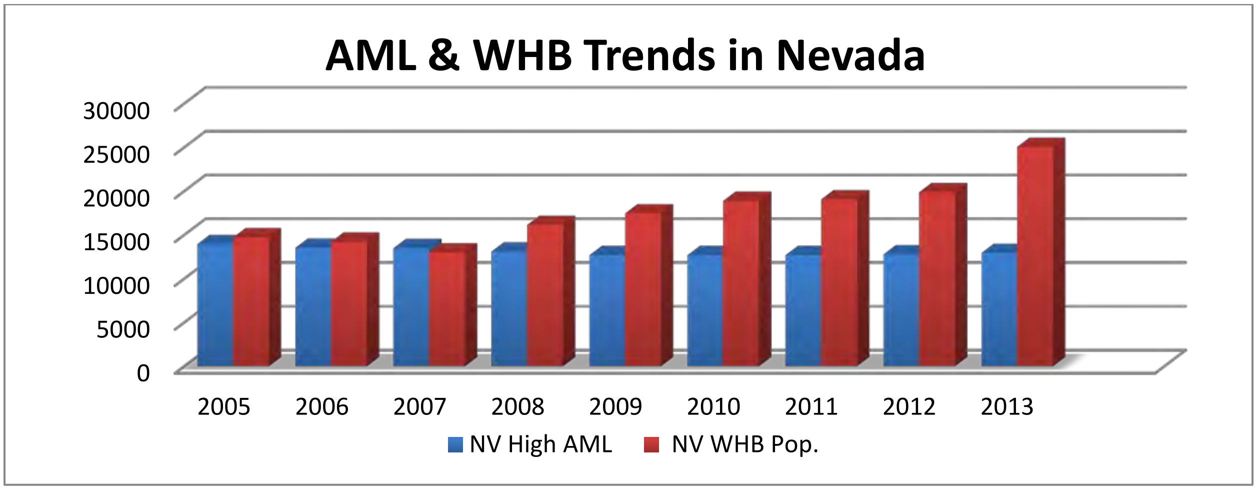
The State of Nevada supports multiple uses on public lands and the responsible and active management of those lands uses, including wild horses and burros, which are protected by the Wild Free-Roaming Horses and Burros Act (the Act) of 1971. While that Act protects them from harassment and unjustified removal or destruction, it also allows for the proper management of wild horse and burro populations within the Herd Management Areas (HMA) on BLM land and Wild Horse and Burro Territories (WHBT) on USFS land that are within Herd Areas (HA). Proper management of herd populations serves to protect their health as well as that of the habitat they and other species rely upon. The Act acknowledges the need to maintain the wild horses and burros within established Appropriate Management Levels (AML). This State supports the Act as it was initially authorized and offers recommendations for alternative management actions necessary to attain and maintain herd sizes that promote the continued health and diversity among wild horses and burros and allows for a sustainable sagebrush ecosystem that is mutually beneficial to all land uses and users.

How HA, HMA, WHBT, and AML were established

Under the Act, BLM and USFS are required to manage wild horses and burros only in HA where they were found when the Act passed in 1971. Through land use planning, the BLM and USFS evaluated each HA to determine if it had adequate food, water, cover, and space to sustain healthy and diverse wild horse and burro populations over the long-term. The areas which met these criteria were then designated as HMA and WHBT (BLM 2013, BLM 2014) (Figure 9).

BLM and USFS also evaluated each HMA to determine how much forage is available for use. The available forage is then allocated among wildlife, wild horses and burros and domestic livestock. The number of horses and burros which can graze without causing damage to the range is called the AML (BLM 2013, BLM 2014).

Nevada's annual AML as compared to Wild Horse and Burro (WHB) population estimates ([http://www.blm.gov/wo/st/en/prog/whbprogram/herd_management/Data.html 2/28/1014](http://www.blm.gov/wo/st/en/prog/whbprogram/herd_management/Data.html))



Current estimates of wild horses from the BLM and USFS are as follows (Shepherd 2014, BLM 2013):

- National: 37,300
- Nevada: 24,000-26,500
- National AML: 26,600
- Nevada AML: 12,688
- 84.3 percent of Nevada HMA are at or exceed AML
- 70 of the 83 HMA statewide are at or exceed AML
- 49 of the 62 HMA overlapping sage-grouse habitat are at or exceed AML
- 10 of the 14 WHBT overlapping sage-grouse habitat are at or exceed AML
- Nationally, over 50,000 horses are currently held in captivity in either short term holding facilities or long term private pastures

Wild horses are capable of increasing their numbers by 18 percent to 25 percent annually, resulting in the doubling of wild horse populations about every 4 years (Wolfe et al. 1989; Garrott et al. 1991). Wild horses are a long-lived species with survival rates estimated between 80 and 97 percent (Wolfe et al. 1980; Eberhardt et al. 1982; Garrrott and Taylor 1990) and they are a non-self-regulating species. There are 62 HMA and 14 WHBT that overlap with sage-grouse habitat in Nevada (BLM 2013, BLM 2014).

While nationally more than 220,000 wild horses and burros have been adopted by private citizens since the program began in 1971, the levels of adoption have decreased dramatically since 2007 (Shepherd, personal communication). In 2013 nationally there were 4,221 horses removed and 2,400 were either adopted or sold. In 2013 in Nevada there were 2,787 horses removed and 89 were adopted or sold (Shepherd 2014). In order to maintain current population levels in Nevada (most are currently near or exceeding the high range of AML), approximately 4,300 – 6,600 horses would need to be removed annually statewide, in the absence of using effective population growth suppression techniques.

The State of Nevada will work closely with federal agencies to develop new, and expand on existing strategies, policies, and best management practices to attain sustainable wild horse and burro populations within HMA and WHBT. The State of Nevada will also engage Congressional representatives and their staff to secure assistance in the implementation of the management activities authorized within the Act.

Goals, Objectives, and Management Actions

Goal 1: Support, promote, and facilitate full implementation of the Wild Free-Roaming Horses and Burros Act of 1971, as amended, including to preserve and maintain a thriving natural ecological balance and multiple-use relationship, without alteration of its implementation by subsequent Congresses or Presidential administrations.

Recognizing that if action is not taken until herd health has become an issue, the range and water resources are likely to be in a highly degraded and potentially irreversible state. Non-active management (e.g. let nature take its course, wait until horse health or resource conditions are critical) is not acceptable management. Non-management will negatively impact or potentially create irreversible habitat impacts within the SGMA; therefore, use all tools available to actively manage wild horses and burros within HMA and WHBT.

Objective 1.1: Maintain healthy and diverse wild horse and burro populations in the State of Nevada in a manner that maintains or is actively managed to trend towards sage-grouse desired habitat conditions, as applicable (see Table 4.1).

Management Action 1.1.1: Focus expenditures of appropriated funds on management of wild horses and burros on public lands over care in captivity.

Management Action 1.1.2: Even if current AML is not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, established AML within the HMA or WHBT should be reduced through the NEPA process and monitored annually to help determine future management decisions. Unless already meeting the lowest established AMLs, during periods of drought, AML should be reduced to remain consistent with the declining levels of available forage).

Management Action 1.1.3: Methods that were used to initially establish AML should be reevaluated to determine if they are still sufficient to maintain or achieve sage-grouse desired habitat conditions, as applicable (see Table 4.1).

Management Action 1.1.4: Use professionals (botanists, rangeland ecologists, wildlife biologists, hydrologists, etc.) from diverse backgrounds to conduct land health, and riparian proper functioning condition assessments.

Management Action 1.1.5: Conduct annual site specific wild horse and burro grazing response indices (Swanson et al. 2006) assessments, and habitat objective assessments.

Management Action 1.1.6: When implementing management activities, water developments, or rangeland improvements for wild horses or burros, consider both direct and indirect effects on sage-grouse and use the applicable Site Specific Consultation Based Design Features (Design Features; see Appendix A) to minimize potential impacts or disturbances.

Management Action 1.1.7: To expedite recovery time and enhance restoration efforts following wildfire or sage-grouse habitat enhancement projects, consider a significant reduction and temporary removal or exclusion of all wild horses and burros within or from burned areas where HMA and WHBT overlap with sage-grouse Core, Priority, and General Management Areas. Wild horse grazing behaviors and specialized physiological requirements make unmanaged grazing on recently burned/treated areas problematic for reestablishment of burned or seeded vegetation (Arnold and Dudzinski 1978, Rittenhouse et al. 1982, Duncan et al. 1990, Hanley 1982, Wagner 1983, Menard et al. 2002, Stoddart et al. 1975, Symanski1994).

Management Action 1.1.8: If current AML is being exceeded, consider emergency short-term measures to reduce or avoid degradation of sage-grouse habitat from HMAs or WHBTs that are in excess of established AMLs within the SGMA.

Plan for and implement an immediate reduction in herd size to a level that would enable the area to trend towards desired habitat conditions in Table 4.1 and to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area. Consider lowering the AML levels to prevent future damage.

Management Action 1.1.9: If monitored sites are not meeting sage-grouse desired habitat conditions, as applicable in Table 4.1, even if AML is being met, and it is determined that wild horses or burros are the primary causal factor, then implement protective measures as applicable in addressing similar emergencies (e.g. fire, flood, drought, etc.).

Management Action 1.1.10: Consider exclusionary or controlled use pasture fencing of riparian or other mesic sites and implement water developments (following the Design Features as described in Appendix A) to ensure dispersal or avoidance of sites heavily impacted by wild horses (Feist 1971, Pellegrini 1971, Ganskopp and Vavra 1986, Naiman et al. 1992). A water source should be provided, as horses traditionally do not leave known water sources just because they are fenced.

Management Action 1.1.11: As climate data become available, adjust wild horse and burro and rangeland management practices to allow for Core, Priority, and General Management Areas to sustain or restore the sagebrush ecosystem resiliency and resistance.

Management Action 1.1.12: Collaborate with weather and climate professionals and agencies (UNR, DRI, NOAA, etc.) to proactively manage the rangeland resources and adjust, as necessary, the current wild horse and burro management policies. Ensure that sufficient ongoing public and political education is provided.

Objective 1.2: Evaluate conflicts with HMA designations in SGMAs and modify LUPs to avoid negative impacts on sage-grouse.

Management Action 1.2.1: Even if current AML is not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, reduce established AMLs within the HMA or WHBT and monitor resource objectives annually to help determine future management decisions. Unless already meeting the lowest established AMLs, during periods of drought, AML should be reduced to levels that are consistent with the declining levels of available forage. *(same as Management Action 1.1.2)*

Management Action 1.2.2: Ensure that Herd Management Area Plans and WHBT plans are developed or amended within the Core, Priority, and General management areas, identified in the State's management areas map, taking into consideration the sage-grouse desired habitat conditions (see Table 4.1).

Management Action 1.2.3: Conduct herd management activities, as originally authorized, to avoid conflicts between the potential implementation of regulations within the Wild Free-Roaming Horses and Burros Act and the Endangered Species Act

Goal 2: As authorized in the Wild Free-Roaming Horses and Burros Act of 1971: Achieve and maintain wild horses and burros at or below established AML within the SGMA and mange for zero horse populations in non-designated areas within the SGMA to reduce impacts to sage-grouse habitat.

Objective 2.1: Meet established AML in all HMA and WHBT in Core, Priority, and General Management Areas within five years.

Management Action 2.1.1: Focus expenditures of appropriated funds on management of wild horses and burros on public lands over care in captivity. *(same as Management Action1.1.1)*

Management Action 2.1.2: Even if current AMLs are not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, reduce established AMLs within the HMA or WHBT and monitor resource objectives annually to help determine future management decisions. Unless already meeting the lowest established AML, during periods of drought, AMLs should be reduced to a level that is consistent with maintaining or trending towards sage-grouse desired habitat conditions, as applicable (see Table 4.1). *(same as Management Action 1.1.2)*

Management Action 2.1.3: *Reevaluate m*ethods that were used to initially establish AML to determine if they are still sufficient to maintain or trend towards sage-grouse desired habitat conditions, as applicable (see Table 4.1). (same as Management Action 1.1.3)

Management Action 2.1.4: Given their capability to increase their numbers by 18%-25% annually, resulting in the doubling in population every 4-5 years (Wolfe et al. 1989; Garrott et al. 1991), conduct wild horse gathers to attain the lowest levels of AML. This in combination with continued and expanded use and development of effective forms of population growth suppression techniques will enable AML to be maintained for longer periods and reduce the frequency of gathers and associated cost and effort.

Management Action 2.1.5: If current AMLs are being exceeded, consider emergency short-term measures to reduce or avoid degradation of sage-grouse habitat from HMA or WHBT that are in excess of established AML within the SGMA.

Plan for and implement an immediate reduction in herd size to a level that would enable the area to trend towards the desired habitat conditions, as applicable in Table 4.1 and to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area. Consider lowering the AML to prevent future damage. *(same as Management Action 1.1.7)*

Management Action 2.1.6: Prioritize gathers for removal or population growth suppression techniques in HMA, HA, and WHBT first within the State's Core Management Areas and then within the Priority and General Management Areas. Additional prioritization should be given for HMA and WHBT that are near AML or where a reduction would serve the most beneficial purpose. Proactively and adaptively manage herd sizes taking into consideration climate variability and other natural phenomena, similar to the restrictions placed on livestock managers.

Goal 3: Support and conduct science based research and monitoring to more efficiently and effectively maintain AML in HMA and WHBT.

Objective 3.1: Implement more effective methods to conduct surveys and monitor wild horse and burro activities, populations, and responses to different herd management techniques.

Management Action 3.1.1: Work with professionals from other federal and state agencies, researchers at universities, and others to continue to develop, expand, and test more effective population growth suppression techniques, including contraception options.

Management Action 3.1.2: Implement a telemetry monitoring program for wild horses. Research regarding the direct interactions between, and indirect effects of wild horses on sage-grouse, has been identified as a need that could further assist the agencies in the development of habitat selection maps (Beever and Aldridge et al. 2011) as well as offer a general understanding of the intensity, timing, and duration of use by wild horses within the SGMA.

Management Action 3.1.3: Investigate the use of automated or time-lapse cameras or other monitoring methods to differentiate horse and livestock use impacts at key areas such as late brood-rearing habitats, use appropriate management methods where combined use does not meet resource objectives. Subsequently, make management changes based upon monitoring data and resource objectives.

7.5 Livestock Grazing

Farming and ranching on private lands in unison with authorized livestock grazing on public lands has been a long standing arrangement for many private landowners in the State of Nevada. Historically, many homesteaders began to farm and ranch much of Nevada's riparian and mesic landscapes due to the availability of surface water or springs. Once developed, many of these mesic areas were expanded by the artificial spreading of water or irrigation. These larger, irrigation induced, privately and publicly owned meadows served to support many species of wildlife in addition to livestock. This expansion of late brood rearing habitat and an increase in sagebrush acreage due to an absence of fire after consumption of fine fuels, (Burkhardt and Tisdale 1976) may be causes of sage-grouse population expansion in the late 1800s and early 1900s (Gruel and Swanson 2012). Today, by allowing for the authorized use of proper and targeted livestock grazing on public lands, private landowners and wildlife habitat managers can serve to protect or even benefit each other if managed properly (by reductions in fuels, targeted grazing of specific habitats and cheatgrass, etc.). The State of Nevada recognizes and supports this long standing beneficial relationship and the property interests associated with grazing permits (Figure 10).

Livestock grazing (primarily sheep and cattle) has occurred on the Nevada landscape for over 170 years at varying levels. Many variables have contributed to the growth and reduction of the size and number of homesteads, as well as the number of livestock using the range, over the past century. The State supports the proper management of livestock grazing on allotted public lands in Nevada. Davies et al. (2011, p. 2575) concluded based on literature review that "Though appropriately managed grazing is critical to protecting the sagebrush ecosystem, livestock grazing per se is not a stressor threatening the sustainability of the ecosystem. Thus, cessation of livestock grazing will not conserve the sagebrush ecosystem."

Dependent on many factors, livestock grazing can have a negative effect, a positive effect, or a neutral effect on sage-grouse habitat (Davies et al. 2009; Knopf 1996; Oakleaf 1971; Svejcar et al. 2014; Whitehurst and Marlow 2013). If implemented appropriately, the recommended actions listed in this section will assist landowners and land managers in managing appropriately to avoid or minimize negative impacts to sage-grouse habitat due to livestock grazing. The actions should also help to maintain the existing resistance and resilience of sagebrush communities and to protect the future persistence and sustainability of the diversity of other sage-grouse habitat types within the sagebrush ecosystem for those who depend on it.

The State supports grazing practices that incorporate a high level of flexibility through adaptive management to achieve the overall management and resource objectives agreed upon by the permittee and the land manager. The State will provide technical support to landowners through its combined resources and through partnerships with other governmental agencies and private industry. The State will continue to support the further understanding and development of rangeland management, resource conservation, rehabilitation, restoration, and protection that can be applied and supported, at least in part, by permittees and other land managers.

The State encourages private landowners to develop and implement conservation plans that serve to maintain or strengthen financial viability that also work to conserve or protect the renewable natural resources of Nevada, including sage-grouse and other wildlife species habitat.

The State will continue to support current, and development of new, public outreach and educational programs that assist with the proper understanding and implementation of the actions listed below to achieve the goals and objectives within this plan.

The State will also work with federal land managers and livestock owners to develop acceptable procedures to conduct consistent rangeland or resource monitoring with appropriate frequency. This should allow for greater flexibility in administering adaptive management decisions to achieve targeted goals and objectives.

The State encourages federal agencies to ensure that any loss of grazing allotment rights that were not directly attributable to the permittees actions or inactions are mitigated to attain a no-net-loss of AUMs.

Conservation Goal, Objective, and Management Actions

Goal 1: Ensure that existing grazing permits maintain or enhance sage-grouse habitat. Utilize livestock grazing when appropriate as a management tool to improve sage-grouse habitat quantity and quality, or to reduce wildfire threats. Based on a comprehensive understanding of seasonal sage-grouse habitat requirements, and in conjunction with the need for flexibility in livestock operations, make cooperative, timely, seasonal range management decisions to meet vegetation management objectives, including fuels reduction.

Objective 1.1: In sage-grouse habitat, manage for vegetation composition and structure that maintains or is actively managed to trend towards sage-grouse seasonal desired habitat conditions, as applicable (see Table 4.1), enhancing resilience and resistance based upon the ability of the ecological site to respond to management. This objective recognizes spatial and temporal variations across seral stages.

Management Action 1.1.1: Within sage-grouse habitat, incorporate sage-grouse desired habitat conditions, as applicable (see Table 4.1), and management considerations into all BLM and Forest Service grazing allotments through allotment management plans (AMP), multiple use decisions, or permit renewals or Forest Service Annual Operating Instructions.

Implement appropriate prescribed grazing actions, at scales sufficient to influence a positive response in sage-grouse habitats, such as NRCS Conservation Practice Standard 528 for prescribed grazing (NRCS 2011).

Management Action 1.1.2: In sage-grouse habitat, work cooperatively on integrated ranch planning within sage-grouse habitat so operations with deeded land, and BLM or Forest Service allotments, can be planned as single units, providing flexibility and adaptive management across all ownerships and not altering stocking rates on operations for progressive management decisions.

Management Action 1.1.3: Continue the use of land health assessments on BLM-administered lands or the Sierra and Central/Eastern Nevada Riparian Field Guides and the Resource Implementation Protocol for Rapid Assessment Matrices on Forest Service-administered lands in sage-grouse habitat to evaluate current conditions as compared to sage-grouse desired habitat conditions described in Table 4.1. Incorporate the results of BLM and Forest Service monitoring and land health assessments into future management applications to ensure the maintenance or active management to trend towards sage-grouse desired habitat conditions. Incorporate terms and conditions into grazing permits and adjust these as needed through monitoring and adaptive management to meet sage-grouse desired habitat conditions.

Management Action 1.1.4: Where current permitted livestock grazing is identified as the causal factor of not meeting the desired habitat conditions, implement management actions (grazing decisions, Annual Operating Instructions [Forest Service only], AMP/Conservation Plan development, or other agreements) to modify grazing management to trend towards desired habitat conditions, as applicable in Table 4.1. Consider singly, or in combination, changes in:

- Season, timing (duration) or rotation of use;
- Distribution of livestock use;
- Intensity of use;
- Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011); and
- Numbers/ AUMs of livestock and other ungulates (includes temporary nonrenewable (TNR) use, and nonuse).

Before imposing grazing restrictions or seeking changes in livestock stocking rates or seasons of permitted use, federal agencies in coordination with grazing permittees must identify and implement all economically and technically feasible livestock distribution, forage production enhancement, weed control, prescribed grazing, off-site water development by the water rights holder, shrub and pinyon/juniper control, livestock salting/supplementing, and riparian pastures and herding. (Eureka County Master Plan 2010)

Management Action 1.1.5: At a minimum, use grazing management strategies for riparian areas and wet meadows to maintain or trend towards riparian Proper Functioning Condition (PFC) and promote brood rearing/summer desired habitat conditions, as described in Table 4.1, within sage-grouse habitat. Within sage-grouse habitat, manage wet meadows to maintain a component of available perennial forbs with diverse species richness to facilitate brood rearing and stabilizing riparian species (Burton et al. 2011) near where water flows to achieve or maintain PFC. Use Ecological Site Descriptions (ESD) or locally relevant information about soils, hydrology, soil moisture, and site potential to set realistic objectives and evaluate assessments and monitoring data (Swanson et al. 2006). Also conserve or enhance wet meadow complexes to maintain or increase amount of edge and cover near that edge to minimize elevated mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010) as observed throughout the stream/watershed and not limited to only easily accessible sites.

Some defined areas of concentrated livestock use may be necessary to protect and enhance the overall riparian area.

Management Action 1.1.6: Authorize new water development for diversion from spring or seep sources only when sage-grouse habitat would not be net negatively affected by the development. This includes developing new water sources for livestock as part of an AMP/conservation plan to improve sage-grouse habitat.

Management Action 1.1.7: Analyze springs, seeps and associated pipelines to find mutually beneficial enhancement opportunities for livestock and wildlife that restores functionality to riparian and mesic areas within sage-grouse habitat, and allow them to be developed.

Management Action 1.1.8: In sage-grouse habitat, encourage and allow vegetation treatments that conserve, enhance, or adaptively restore resilience and resistance over time. This includes adaptive management as part of an AMP/Conservation Plan to improve sage-grouse habitat.

Management Action 1.1.9: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses that are in and adjacent to sage-grouse habitat to determine if additional efforts should be made to restore sagebrush or to improve habitat quality for sage-grouse. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving, enhancing, or protecting the rest of the sage-grouse habitat, then no restoration may be necessary. Assess the compatibility of these seedings for sage-grouse habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011), or other analyses such as the Humboldt-Toiyabe Resource Implementation Protocol for Rapid Assessment Matrices (USDAFS - HTNF 2007).

Management Action 1.1.10: In sage-grouse habitat, ensure that the design of any new structural range improvements and the location of supplements (salt or protein blocks) to enhance sage-grouse habitat or minimize impacts in order to maintain or trend towards sage-grouse desired habitat conditions, as applicable (see Table 4.1). Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or their increase following construction must be considered in the project plan and then monitored, treated, and rehabilitated post-construction.

Management Action 1.1.11: Locate salting and supplemental feeding locations, and temporary or mobile watering and new handling facilities (corrals, chutes, etc.) at least 1/2-mile from riparian zones, springs, meadows, or 1 mile from active leks in sage-grouse habitat, unless the pasture is too small or another location offers equal or better habitat benefits. The distance should be based on local conditions.

Management Action 1.1.12: To reduce sage-grouse strikes and mortality, remove, modify or mark fences in high risk areas within sage-grouse habitat based on proximity to lek, lek size, and topography (Christiansen 2009; Stevens 2011). Consideration of the utility of the fence should also be taken into consideration to ensure that its removal does not promote degradation of the overall management for habitat or other desired conditions (Swanson et al. 2006).

Management Action 1.1.13: In sage-grouse habitat, monitor, treat and, if necessary, restore sites with invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007). State listed noxious weeds (NRS Chapter 555) should be given the highest priority. In general, monitor, map, treat (using integrated pest management and associated tools), and restore sites that have invasive and noxious weed species, especially those associated with disturbance activities.

Management Action 1.1.14: Consider all options to allow responsible management of livestock grazing on an allotment before any voluntary withdrawal of a grazing permit is considered, in conformance with the multiple use sections of the Taylor Grazing Act. All permit relinquishments should be voluntary.

Management Action 1.1.15: Prior to implementation, establish project monitoring sites where vegetation treatment is planned and monitor at least annually during the recovery period. To ensure effective recovery, monitoring should continue for a number of years immediately following the livestock exclusion period and following livestock reintroduction, depending on local site conditions.

Management Action 1.1.16: When conditions, i.e., climatic variations (such as drought) and wildfire, require unique or exceptional management, work to protect sage-grouse habitat on a case by case basis and implement adaptive management to allow for vegetation recovery that meets resistance, resilience, and sage-grouse life cycle needs in sage-grouse habitat as needed on an individual allotment basis.

Management Action 1.1.17: During the annual grazing application, work with permittees to avoid consistent concentrated turn-out locations for livestock within approximately 3 miles of known lek locations during the March 1 to May 15 period. During the March 1 to May 15 period, avoid domestic sheep use, bedding areas, and herder camps within at least 1.24 miles (2 kilometers) of known lek locations. Utilize land features and roads on maps provided to the permittee to help demarcate livestock use avoidance areas. Require terms and conditions language for affected livestock grazing permits regarding livestock turnout locations during the lekking period. During the lekking period, use best management practices to avoid livestock aggregation around the lekking grounds.

Management Action 1.1.18: Strive to improve and maintain regular communication at the allotment level between land management agency and the permittee to encourage proper management techniques. Land management agencies should coordinate with relevant state, local and tribal government agencies and permittees to conduct regular trend monitoring at the allotment level. Actively pursue and implement cooperative permittee monitoring, such as described in Perryman et al. 2006, Swanson et al. 2006.

Management Action 1.1.19: Promote and implement proper livestock grazing practices that promote the health of the perennial herbaceous vegetation component. Perennial grasses, especially, are strong competitors with cheatgrass (Booth et al. 2003; Chambers et al. 2007; Blank and Morgan 2012). Field research has demonstrated that moderate levels of livestock grazing can increase the resiliency of sagebrush communities, reduce the risk and severity of wildfire, and decrease the risk of exotic weed invasion (Davies et al. 2009 and Davies et al. 2010).

Management Action 1.1.20: To reduce the risk of fire and enhance restoration in large contiguous blocks of cheatgrass-dominated sagebrush or sage-grouse habitats that are next to highly flammable cheatgrass dominated lands, create local NEPA documented plans to use tools (e.g. dormant season TNR AUM authorizations and stewardship contracted grazing), to reduce fuels in areas dominated by invasive plants (Schmelzer et al. 2014) especially after high production growing seasons with favorable moisture. Use adaptive management to allow the use of TNR during other seasons, if science emerges demonstrating effectiveness of such practices. Planning should be conducted on an allotment specific basis, and may be contained in AMPs, multiple use decisions, or permit renewals.

Management Action 1.1.21: To aid in planning adaptive management for the purpose of maintaining health of important forage plants (perennials needed for resilience and resistance), cooperatively strategize how various areas in sage-grouse habitat allotments can be managed differently each year to achieve positive grazing response index scores (Perryman et al. 2006; Reed et al. 1999; Wyman et al. 2006; and USDA USFS 1996) and meet resource objectives.

7.6 Anthropogenic Disturbances

Anthropogenic disturbances, as defined in Section 3.0 of this State Plan, are a threat to sage-grouse and their habitat in Nevada; however these activities are a vital part of Nevada's economy. The State of Nevada seeks a balanced approach that allows for the preservation of Nevada's economy, while conserving and protecting sage-grouse populations and the sagebrush ecosystem upon which they need to survive. Nevada's strategy is to provide consultation for project planning to first avoid and minimize impacts to sage-grouse (see Section 3.0) and then to offset residual impacts through compensatory mitigation via the Conservation Credit System (see Section 8.0).

Anthropogenic disturbances can negatively impact sage-grouse both directly and indirectly, and through various mechanisms. Anthropogenic disturbances can directly impact sage-grouse by causing direct loss of habitat, avoidance behavior to infrastructure (Doherty et al. 2008) and to otherwise suitable habitat (Lyon and Anderson 2003, Holloran 2005, Kaiser 2006, Doherty et al. 2008), direct mortality through collision with infrastructure (Beck et al. 2006, Stevens et al. 2012) and mosquitos carrying the West Nile virus (Walker and Naugle 2011) associated with certain artificial ponds created by development (Zou et al 2006), and negative impacts to survival and reproduction (Lyon and Anderson 2003, Holloran 2005, Kaiser 2006, Aldridge and Boyce 2007, Holloran et al. 2007). Indirect impacts on sage-grouse demographics can be caused by noise produced from operations (Braun et al. 2002, Holloran 2005, Kaiser 2006, Blickley et al. 2012), vehicle traffic on associated roads (Lyon and Anderson 2003), and increased predation by raptors perching on associated power lines (Ellis 1984). Moreover, anthropogenic disturbances can lead to an increase in the presence of cheatgrass and other invasive plant species (Bradley and Mustard 2006, Manier et al. 2014). In addition, habitat fragmentation resulting from cumulative effects of multiple anthropogenic disturbances across the landscape has been shown to have long term negative impacts on sage-grouse populations (Johnson et al. 2011, Knick and Hanser 2011, Knick et al. 2013).

Mining

Mining is a vital part of the State of Nevada's economy both currently and historically. The initial discovery of the Comstock Lode silver ore deposit in Virginia City in the 1850s was central to the settling and development of Nevada, as well as a major reason for Nevada's admission into the United States in 1864. The Nevada Department of Taxation currently estimates the net assessed mineral value in the State to be approximately $5.1 billion (State of Nevada 2014) and the Nevada Bureau of Mines and Geology (NBMG) estimates the total production value at $10.76 billion (NBMG 2014)[3]. The annual tax revenue collected in fiscal year 2013 was approximately $236 million (State of Nevada 2014). It is estimated that Nevada's mining economic output contributes a 6% share of Nevada's statewide GDP (Nevada Mining Association 2011).

The primary type of mineral exploration and development in the state of Nevada is locatable minerals, including gold, silver, and copper. Locatable mineral development and exploration is governed under the

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[3] The State of Nevada 2014 estimate is for FY 12-13 (June 2012 – July 2013) and the NBMG estimate is for calendar year 2012. Both estimates also include geothermal energy and petroleum production.

General Mining Law of 1872 and is a non-discretionary activity on federal lands. Additional federal, state, and local laws also govern locatable minerals. Salable and non-energy leasable mineral exploration and development also occurs, though to a lesser extent. Salable mineral materials, which are common varieties of construction materials and aggregates, such as sand, stone, and gravel are governed under the Materials Acts of 1947. Government and non-profit organizations may obtain these resources free of charge for community purposes on BLM and USFS administered lands. The Nevada Department of Transportation and local governments are the primary users of gravel and sand resources on federal lands in Nevada. Non-energy leasable minerals, such as potassium and sodium, which are governed under the Mineral Leasing Act of 1920 are also present, however there are currently no leases in sage-grouse habitat in Nevada (BLM 2013).

The extent of mining activities across the state of Nevada overlaps with the range of sage-grouse habitat. There are approximately 2 million acres of locatable mineral claims in sage-grouse habitat in Nevada (BLM 2013). The total “footprint” of mining in Nevada is estimated at 169,029 and 181,340 acres by BLM and NDEP respectively (Johnson personal communication 2014, Holmgren personal communication 2014). Mining and its associated facilities and infrastructure may result in habitat fragmentation, direct habitat loss, and indirect impacts decreasing the suitability of otherwise suitable habitat (USFWS 2013). The specific impacts of mining on sage-grouse and their habitat have not been studied in the peer reviewed literature (Manier 2013).

Non-Renewable Energy Production

There is currently little oil and gas development in Nevada. Oil production in Nevada has been on a steady decline and is currently limited to approximately 336,000 barrels of oil production annually (Nevada Division of Minerals 2014a). Within sage-grouse habitat it is limited to two major basins, including the Railroad Valley and Pine Valley, with Railroad Valley being the predominant oil-producing valley in Nevada (BLM 2013). However, with recent federal approval of oil and gas exploration in, Nevada (BLM 2014), coupled with the emergence of new technologies, there may be potential for increased oil and gas production in the State pending results of exploration.

In a comprehensive literature review of the impacts of energy development, principally oil and gas, on sage-grouse conducted by Naugle et al (2011), all studies reported negative effects, while no positive impacts to sage-grouse populations or habitat were reported. Negative responses of sage-grouse were consistent regardless of whether lek dynamics or demographic rates were studied (Naugle et al. 2011). The specific direct and indirect impacts are described above.

Renewable Energy Production

The development, transmission, and distribution of renewable and non-renewable energy are a high priority for the state of Nevada. Shifting national and state energy policies, as well as Nevada’s favorable conditions for different types of renewable energy resources, renewable energy development is likely to increase in the State. The SEP supports Nevada’s Renewable Portfolio Standard goal of 25% of Nevada’s energy coming from renewable sources by 2025. In addition, the Nevada Public Utilities Commission this year ruled in accordance with Nevada S.B. 123 requiring the retirement of no less than 300 MW of coal-fired electrical generating capacity on or before December 31, 2014, and not less than

250 MW of coal-fired electrical generating capacity on or before December 31, 2017 (Public Utilities Commission of Nevada 2014).

Renewable energy resources in Nevada include geothermal, wind, solar, and biomass. Nevada has vast geothermal resources and is leading the way in geothermal energy development in the United States. As of the end of 2013, of the 3442 MW of installed generating capacity in the U.S. (Matek 2014), Nevada contributes 586 MW (Nevada Division of Minerals 2014b), representing approximately 17% of total installed capacity in the U.S. Nevada is outpacing the rest of the country in developing geothermal projects. Nevada accounted for approximately 41% of the total number of projects under development in the U.S. since 2011 (Matek 2014). Nevada currently has 22 operating geothermal plants at 14 different locations (Nevada Division of Minerals 2014b). There are significant geothermal resources in northern Nevada that coincide with the sage-grouse habitat range. Recent geothermal projects that coincide with sage-grouse habitat include the Tuscarora, McGinness Hills, and Jersey Valley Geothermal Power Plants.

Wind energy is one of the fastest growing renewable energy sectors in the U.S.; however the potential viability for development of this resource in Nevada is currently limited. Analysis conducted as part of BLM's Wind Energy Development Programmatic EIS showed most of Nevada's wind power classification rated as poor to fair, with only small pockets classified as good to outstanding (BLM 2005). Some of those pockets however, overlap with sage-grouse habitat. Currently there is one wind generation facility in Nevada, the Spring Valley Wind Project; an approximately 150 MW facility located approximately 30 miles east of Ely, NV.

The BLM, as part of a Programmatic EIS for Solar Energy Development, developed Solar Energy Zone (SEZ), defined as an area well suited for utility scale production of solar energy. Five SEZs were identified for Nevada; all located in Clark, southern Nye, and Lincoln counties, outside the range of sage-grouse (BLM 2012). There are currently no solar energy rights of ways within sage-grouse habitat in Nevada (BLM 2013).

There is currently no significant commercial conifer biomass energy economy in Nevada (BLM 2013); however considering that pinyon-juniper expansion is one of the major threats facing sage-grouse in Nevada, the SEP encourages exploring and incentivizing biomass energy development in the State.

Renewable energy development can negatively impact sage-grouse both directly and indirectly through various mechanisms. Impacts to sage-grouse from geothermal energy development have not been assessed in the scientific literature because the development has been too recent to identify immediate and lag effects (Knick et al. 2011). There are currently no commercial solar projects operating in sage-grouse habitats at this time, so the impacts cannot be assessed. There has been one study on the effects on sage-grouse from wind energy developments recently completed in south-central Wyoming, which demonstrated that the relative probabilities of sage-grouse nest and brood success decreased with proximity to wind turbines (LeBeau 2012). Wind energy generation also requires tall structures, which can provide artificial nesting and perching substrate for sage-grouse predators (Knight and Kawashima 1993). Renewable energy development requires many of the same features for construction and operation as non-renewable energy, so it is anticipated that the potential impacts from direct habitat loss, habitat fragmentation through roads and power lines, noise, and increased human presence would most likely be similar to those for non-renewable energy production (USFWS 2010).

Infrastructure
Infrastructure, whether related to energy production, mining, or any other purpose, can adversely impact sage-grouse. Infrastructure can result in habitat loss and fragmentation as well as sage-grouse avoidance of otherwise suitable habitat. In addition, infrastructure can provide a source for the spread of invasive species and provide artificial subsidies for predators (USFWS 2013). Infrastructure most common in Nevada includes transmission lines, distribution lines and roads. Other types of infrastructure may also include, but is not limited to, pipelines, communication towers, and fences.

Transmission and distribution lines (hereafter collectively referred to as power lines) are necessary for transmitting energy from power production facilities and distributing that power to homes and businesses. Power lines may directly impact sage-grouse through habitat loss and fragmentation (Knick et al. 2013), as well as direct mortality due to collisions (Beck et al. 2006). Indirect habitat loss due to avoidance of vertical structures, presumably due to increases in predator populations is also a concern (Manier 2013). Power lines have been shown to decrease male lek attendance (Ellis 1985) and probability of lek persistence (Walker et al. 2007), as well as causing avoidance behavior of brood-rearing habitat (LeBeau 2012). Power lines have been shown to increase predator distributions and hunting efficiency resulting in increased predation on sage-grouse (Connelly et al. 2004). Preliminary results from a ten-year study on the impacts of the Falcon-Gonder transmission line on sage-grouse population dynamics in Eureka County, Nevada show a significant negative effect of the transmission line on nest success and female survival, weak negative effect on male survival, and no support for impacts on nest site selection and female nesting propensity (Gibson et al. 2013). Nest success and female survival, along with chick survival, are the demographic rates that have been shown to be important for population growth (Taylor et al. 2012).

Roads are widespread through the sage-grouse range and can impact sage-grouse through a variety of mechanisms. A study along I-80 in Wyoming and Utah between 1970 and 2003 found no leks within 1.25 miles of the interstate, and fewer birds on leks within 4.7 miles of the interstate, than further distances (Connelly et al. 2004). Roads can negatively impact sage-grouse through direct mortality due to vehicle collision, decreased male lek attendance due to increased traffic (Holloran 2005), avoidance behavior (Lyon and Anderson 2003, LeBeau 2012), and reduced nest initiation rates (Lyon and Anderson 2003). Roads can also facilitate the spread of invasive species (Gelbard and Belnap 2003).

Goals, Objectives, and Management Actions

Goal 1: Manage anthropogenic disturbance development in a manner that provides for the long-term conservation of sage-grouse and their habitat, while balancing the need for continued development of the resources.

Objective 1.1: Achieve net conservation gain of sage-grouse habitat due to new anthropogenic disturbances and any associated facilities and infrastructure within the Sage-Grouse Management Area (SGMA) in order to maintain stable or increasing sage-grouse populations.

Management Action 1.1.1: All new proposed anthropogenic disturbances within the SGMA will trigger timely SETT Consultation for application of the "avoid, minimize, mitigate" process (see Section 3.0). This will serve as a centralized impact assessment process that provides consistent evaluation, reconciliation and guidance for project development.

Management Action 1.1.2: Avoid new anthropogenic disturbance activities and its associated facilities and infrastructure within the SGMA. Locate activities, facilities, and infrastructure in non-habitat wherever possible. Avoidance of a disturbance within sage-grouse habitat is the preferred option. If avoidance cannot be reasonably accomplished, the project proponent must demonstrate why it cannot be reasonably accomplished in order for the SETT to consider minimization and mitigation alternatives. The process to demonstrate that avoidance cannot be reasonably accomplished (the "avoid process") is determined by the four management categories. (See Table 3-1 for more details on the avoid process.) If development cannot be sited in non-habitat, it should occur in the least suitable habitat.

Management Action 1.1.3: If adverse impacts to sage-grouse and their habitat cannot be avoided, require project proponents to minimize impacts by employing Site Specific Consultation-Based Design Features (Design Features; see Appendix A) appropriate for the project. This may include seasonal operational restrictions, noise restrictions, clustering disturbances, and placing infrastructure in previously disturbed locations.

Management Action 1.1.4: Technically evaluate and where reliability is not adversely impacted, seek to site new linear features in existing corridors (Figure 11) or, at a minimum, co-locate with existing linear features in Core, Priority, and General Management Areas.

Management Action 1.1.5: Reduce and eliminate artificial hunting perches and nesting substrate for aerial predators. This can be achieved by installing anti-nesting and anti-perching devices on new power lines (see Section 7.3) or burying power lines. Bury distribution power lines of up to 35kV where ground disturbance can be minimized, and where technically and economically feasible. Where technology and economic factors allow, bury higher kV power lines (see Appendix A). Sage-grouse desired habitat conditions (see Section 4.0) will be incorporated when reclaiming the site.

Management Action 1.1.6: Encourage continued research in the development of more effective perching and nesting deterrent options (see Section 7.3).

Management Action 1.1.7: Aggressively engage in rehabilitation/weed control efforts during pre- and post-project construction.

Management Action 1.1.8: If impacts from anthropogenic disturbances cannot be avoided and after minimization options have been exhausted, residual adverse impacts are required to be offset through compensatory mitigation. Mitigation obligations will be determined through the Conservation Credit System (see Section 8.0).

Objective 1.2: Explore options to minimize impacts from existing and abandoned anthropogenic disturbances and associated infrastructure.

Management Action 1.2.1: While SETT Consultation and the "avoid, minimize, mitigate" process do not apply retroactively to existing anthropogenic disturbances, encourage existing operators to incorporate the Design Features outlined in Appendix A and contact the SETT for timely input on techniques and practices to avoid and minimize existing impacts to sage-grouse and their habitat.

Management Action 1.2.2: Inventory abandoned mine sites within sage-grouse habitat, where practical, and reclaim sites to trend towards sage-grouse desired habitat conditions (see Section 4.0). Coordinate with the Abandoned Mine Lands Program on this effort.

Management Action 1.2.3: Work with the energy industry to explore opportunities to install anti-nesting and anti-perching devices on existing power lines and tall structures and to bury existing power lines where technology and economic factors allow.

Management Action 1.2.4: Inventory power lines and utility structures that are no longer in use and look for opportunities to decommission the lines and reclaim the sites to trend towards sage-grouse desired habitat conditions (see Section 4.0).

7.7 Recreation & Off-Highway Vehicle Activities

Nevada offers some of the most robust recreational and OHV experiences in the nation due, in large part, to its high percentage of accessible federally managed public lands. Recreation, in all of its forms, creates a significant benefit to local and statewide economies. Extensive networks of roads and trails offer recreationists excellent access to most of Nevada's expansive basin and range high desert ecosystems. This extensivity of roads and trails may also create impacts on sagebrush habitats and sage-grouse that may be difficult to measure.

While recreational and off-highway vehicle use is one of the many acceptable multiple-uses on our federal public lands, it also requires frequently reviewed and updated policies that allow for greater adaptive management. This may assist in ongoing efforts to protect and preserve sensitive land forms, plants, and animals from levels or types of disturbance that create unnatural or unduly negative impacts. Potential impacts on sage-grouse and their habitat associated with recreational activities include but are not limited to: increases in noise levels, distribution of invasive plants, generation of fugitive dust, and effects on predator prey relationships (Manier 2013).

In Nevada, the recent creation of the Commission on Off-Highway Vehicles provides a mechanism and a funding source to educate users on how to responsibly use off-highway vehicles. Educational efforts will focus on minimizing adverse effects due to uses in or near sage-grouse habitats during certain seasons and times of day. It may also provide a funding source to allow the State to join with the federal agencies to better plan, develop, and manage a coordinated and designated system of off-road vehicle trails in Nevada. The off-highway vehicle registration system allows state law enforcement personnel to access vehicle registration information and identify vehicle titleholders in instances where state or federal laws pertaining to off-road access or use are violated.

Conservation Goals, Objectives, and Management Actions

Goal 1: Conserve sage-grouse and their habitat while allowing for continued recreational access to public lands.

Objective 1.1: Avoid or minimize recreation and OHV negative direct and indirect impacts to sage-grouse and their habitats and monitor sites for potential impacts.

Management Action 1.1.1: Establish appropriate ambient noise levels for undisturbed sage-grouse leks. Noise restrictions should generally apply between the hours of 6:00 p.m. to 9:00 a.m. as these are the hours most critical for communications of sage-grouse and auditory detection of predators (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

Management Action 1.1.2: Take measures to minimize or reduce activities and to avoid an ambient noise level increase >10 dB at the edge of leks during the lekking season generally, March 1 through May 15 from one hour before sunrise until 9:00 a.m.

Management Action 1.1.3: Assist in efforts to enhance collaborative monitoring through volunteer organizations, recreational groups, etc., to collect data that would assist in the protection, enhancement, or restoration of sage-grouse habitats.

Management Action 1.1.4: Support studies that further the understanding of the relationship between recreational uses and their potential impacts on sage-grouse.

Management Action 1.1.5: Utilize sage-grouse habitat mapping to inform state and federal recreation management plans.

Management Action 1.1.6: Where feasible locate recreation trails strategically to create or augment fuel breaks in the margins of sage-grouse habitats and landscapes and not create roads or trails where they cause net negative direct and indirect impacts.

Objective 1.2: Support and implement efforts to reduce the potential for additional sage-grouse habitat fragmentation from unauthorized 'trail making'.

Management Action 1.2.1: Support and promote efforts by state, local, and federal agencies and recreational groups to promote educational campaigns that encourage responsible OHV and recreation activities that avoid or minimize negative impacts to sage-grouse and their habitat, including the spread of invasive species.

Management Action 1.2.2: Work with state, local, and federal agencies and recreational groups to inventory unauthorized trails in Core, Priority, and General Management Areas and where feasible restore trails to trend towards sage-grouse desired habitat conditions (see Table 4-1).

Objective 1.3: Promote the leveraging of funding from all sources when addressing sage-grouse habitat enhancement, restoration, or preservation projects.

Management Action 1.3.1: Develop a database to share with interested agencies and groups to maximize efforts and leverage funding.

Management *Action 1.3.2:* Encourage and support the Commission on Off-Highway Vehicles to expend OHV registration funds to enhance, restore, or protect sage-grouse habitat.

8.0 CONSERVATION CREDIT SYSTEM

The Nevada Conservation Credit System (CCS)[4] is a pro-active solution that provides net conservation benefits for sage-grouse, while balancing the need for continued human activities vital to the Nevada economy and way of life. The CCS creates new incentives for private landowners and public land managers to preserve, enhance, restore, and reduce impacts to important habitat for the species.

The CCS is a market-based mechanism that quantifies conservation outcomes (credits) and impacts from new anthropogenic disturbances (debits), defines standards for market transactions, and reports the overall progress from implementation of conservation actions throughout the sage-grouse range within Nevada. The CCS establishes the policy, operations, and tools necessary to facilitate effective and efficient conservation investments. The CCS is intended to provide regulatory certainty for industries by addressing compensatory mitigation needs whether or not the species is listed under the ESA.

Goal and Scope

The goal of the CCS is to achieve net conservation gain of sage-grouse habitat due to new anthropogenic disturbances within the Sage-grouse Management Area (SGMA; Figure 2), in order to stop the decline of sage-grouse populations. Proposed anthropogenic disturbances, as defined in Section 3.0 of this plan, must seek to avoid, minimize, and mitigate impacts to sage-grouse habitat. After all practicable economically and technically feasible possibilities to avoid and minimize impacts to sage-grouse habitat have been exhausted, residual adverse impacts are required to be offset by mitigation requirements as determined through the CCS.

Anthropogenic disturbances occurring on BLM and USFS lands within the SGMA require timely consultation with the SETT. Private landowners are not required to mitigate anthropogenic disturbances on their land, but are welcome to voluntarily generate, sell, or purchase credits in the CCS. The CCS scope can be expanded in the future to support additional conservation needs or to include other states within the sage-grouse range.

Roles and Responsibilities

The *DCNR Division of State Lands*, holds ultimate authority over CCS design, operations, and management. The *SEC* oversees CCS operations and approves changes to the program. *The Administrator* manages the CCS's day-to-day operations, ongoing program improvements, facilitates transactions, and reports programmatic results. CCS operations are also informed by *Resource Managers* (e.g. BLM, NDOW, USFS, USFWS) and by a *Science Committee* to ensure it functions according to current laws, policies, and regulations and is consistent with the best available science.

Credit Developers are landowners, land managers, organizations, or agencies, that generate, register, or sell credits in the CCS. *Credit Buyers* are entities that purchase mitigation credits to offset impacts from new anthropogenic disturbances or to meet other conservation objectives.

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[4] For more information please refer to *The Nevada Conservation Credit System Manual* on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

What are Credits and Debits?

Credits are the currency of the CCS. A credit represents a verified *"functional acre"* that meets the durability criteria defined by the CCS, such as committing to a Customized Management Plan that outlines actions to maintain habitat performance and to limit risks from future impact for the duration of the project. A functional acre is based on habitat quality ("function") relative to optimal conditions, and quantity (acres). This is determined through the Habitat Quantification Tool (HQT; see below).

Debits are similar to credits, but are the quantified and verified units of functional acres lost due to a new anthropogenic disturbance.

Generating and Purchasing Credits

The steps for generating and purchasing credits are depicted below. Blue chevrons signify the steps undertaken to generate credits and green chevrons represent the purchase of credits.

Calculating Credits and Debits

Habitat Quantification Tool (HQT)[5]

The HQT is a method to estimate habitat quality and quantify debits and credits. The HQT uses a set of metrics, applied at multiple spatial scales, to evaluate vegetation and environmental conditions related to sage-grouse habitat quality and quantity. The HQT enables the CCS to create incentives to generate credits in the most beneficial locations for the sage-grouse, and to minimize impacts to existing high quality habitat.

The HQT is used to calculate scores for each type of seasonal habitat. Habitat condition is expressed in functional acres, relative to optimal conditions. The functional acre score is adjusted to account for indirect effects of the local area surrounding the site. Mitigation ratios are then applied.

Mitigation Ratios

Mitigation ratios incorporate biologically significant factors that cannot currently be incorporated into the HQT. They enable offset transactions to achieve a net benefit for the species by ensuring the functional acres of credit acquired is greater than the functional acres of debit. The mitigation ratios create incentives for avoidance of impacts and preservation, enhancement, and restoration of habitat in important areas. This includes avoiding and protecting seasonal habitats that are scarce for a particular population. Mitigation ratios are determined by the:

- Habitat Importance Factor: The value is influenced by the location of a credit or debit site in Core, Priority, or General Management Areas (Figure 4)
- Seasonal Habitat Scarcity Factor: This is determined by the portion of seasonal habitat type (nesting, late-brood rearing, and winter) impacted.

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[5] For more information please refer to *The Habitat Quantification Tool Scientific Methods Document* on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

Debits are adjusted based on proximity to potential credit sites (Proximity Factor) to determine the credit obligation that must be purchased to offset a debit project. Credit obligation increases if the credits purchased are located outside the same population as the debits. This incentivizes mitigation in close proximity to debit sites.

Regulatory Assurances

Verification

Credit and debit projects require verification to ensure that calculations represent a true and accurate account of on-the-ground implementation and habitat function and assurances that projects are maintained over time. *Third-party Verifiers*, trained and certified by the Administrator, conduct independent checks using the HQT methods. *Credit Verification* is required before credit release and every fifth year. *Debit Verification* is required before the project begins, during project implementation, and when debits end or decrease. Periodic spot checks and audits are also required.

Reserve Account

The *Reserve Account* is a pool of credits, functioning like an insurance fund, that replace credits that are invalidated due to a force majeure event, mismanagement, or competing land uses. A percentage of credits from each credit transaction are deposited into the reserve account. Factors that determine the Reserve Account contribution are: base contribution, probability of wildfire, and probability of competing land uses. In the case of unintentional credit reversal due to force majeure or competing land use events, the Administrator withdraws credits from the reserve account to cover the invalidated credits at no cost to the Credit Developer for a limited duration until the original credits are replaced.

Additionality and Stacking of Multiple Payments

Projects that generate credits must be additional to activities that would occur in the absence of the CCS. On private and public lands, a credit project is additional if the land manager is not already performing or planning to perform conservation actions using funding sources other than the CCS. *Stacking* allows a Credit Developer to receive multiple payments for conservation actions on the same area of land, but only receive credit for the additional conservation benefits.

Durability

The CCS uses *performance assurances* on private and public lands to ensure the durability of credits generated throughout the life of the credit project. Performance assurances are implemented through contract terms and financial instruments. The *durability of projects on public lands* is safeguarded using land protection mechanisms (e.g. right-of-ways), financial instruments (e.g. contract performance bonds) and the Reserve Account.

Additional Policy Considerations

The *Service Area*, the area in which credits can be exchanged, for the CCS is the SGMA.

Baseline is the starting point from which credits and debits are measured. Credits and debits represent the change from baseline that results from implementing a project. *Credit baseline* is a state-wide standard for each seasonal habitat type equivalent to the average habitat functionality. Project sites must be at the credit baseline, at a minimum to begin generating credits. *Debit baseline* is the pre-project habitat function value for each seasonal habitat type for a proposed debit project.

Credit release occurs when performance criteria milestones which increase habitat function are achieved on a credit site. Specific performance criteria are defined in each project's *Customized Management Plan*. Credit release can occur in single or multiple increments depending on credit project type; including: *preservation projects*, *enhancement projects*, and *restoration projects*.

The CCS requires that the *project life* of a credit project must be equal to or greater than the duration of the impacts of the debit project it is offsetting.

Credit variability may occur due to annual climatic or other natural conditions affecting habitat functionality. As a result, a *tolerance threshold* of above or below 10% habitat function is applied.

9.0 MONITORING AND ADAPTIVE MANAGEMENT

Monitoring and adaptive management are key components of successful resource management plans in order to derive the greatest environmental benefit given limited agency resources. Incorporation of these strategies in the planning process will help ensure management actions identified in this State Plan are implemented and effective at achieving the intended goals and objectives for the benefit of sage-grouse. Adaptive management allows for information learned through monitoring to be integrated into iterative decision making that can be adjusted as outcomes from management actions become better understood (Williams et al. 2009). Management that does not achieve intended goals and objectives can be modified through adaptive management and contribute to the emerging understanding of management action response, sage-grouse habitat requirements, sage-grouse behavior, and sagebrush ecosystem processes.

Monitoring

Two main categories of monitoring will occur for the State Plan: 1) inventory monitoring and 2) management action monitoring. These are described below. Within each of these categories, additional concepts will need to be considered: short and long-term monitoring, monitoring at multiple scales (e.g., site, landscape) (Swanson et al. 2006), and, for management action monitoring, monitoring for implementation and for effectiveness.

Inventory monitoring assesses the status/extent/condition of sage-grouse populations (e.g., sage-grouse population trends over time), sage-grouse habitats (e.g., gain/loss of sage-grouse habitats over time), and of the threats to sage-grouse (as identified in the State Plan, e.g., how many acres of PJ encroachment are occurring each year). Inventory monitoring provides a quantified understanding of changes in condition and extent of sage-grouse populations, habitat, and threats over time and space, can help prioritize efforts, and can help evaluate success in meeting short and long-term goals and objectives. Many of the state and federal agencies already provide a level of inventory monitoring appropriate for the needs of the state plan and this will be incorporated into the state's monitoring plan- more detail is provided below.

This State Plan identified many management actions to address specific threats. Monitoring of management actions is necessary to ensure that individual actions are accomplishing what they are intended to do. The state will require that monitoring plans be developed for all management actions that occur under direction of the State Plan, including those intended to ameliorate threats outlined in Section 7.0. These plans will include monitoring for implementation and monitoring for effectiveness. Monitoring associated with the Conservation Credit System (see Section 8.0) is detailed in the Habitat Quantification Tool Scientific Methods Document[6] {currently under development}.

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[6] For more information please refer to The Habitat Quantification Tool Scientific Methods Document on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/[7] Scale of Management Action Monitoring is dependent on management action details specified in Section 7.0

Management Action monitoring for implementation includes: 1) a brief description of the project and the work completed, 2) pre- and post-project photographs, 3) short term monitoring of weather (especially precipitation and when it occurs) and other events (e.g., fire, floods, insects, infestations, etc.) and on-going management (e.g., season of livestock use or livestock, horse, and wildlife population levels) (Swanson et al. 2006), 4) lessons learned during implementation, 5) discussion of impacts to uses and other resources, 6) recommendations on the implementation of future projects, 7) maintenance performed, and 8) accounting of expenditures.

Management Action monitoring for effectiveness can play a key role in demonstrating the accountability, success, and value of management investments. Effectiveness monitoring is designed to determine if the project is effective at meeting its biological and ecological goals and objectives. Project-scale effectiveness monitoring measures environmental parameters to ascertain whether management actions were effective in creating the desired change(s) in habitat conditions and species response. There are at least three important reasons to conduct project-scale effectiveness monitoring on a management action or a change in management: 1) to determine the biotic and abiotic changes resulting on, and adjacent to, the treatment area; 2) to determine if treatment and management actions were effective in meeting the objective(s); and 3) to learn from the management actions and to incorporate new knowledge in future treatment design.

The following concepts should be addressed in all monitoring plans:

- Identify the site conditions and the reasons for implementing management action(s) at the site.
- Set monitoring objectives and indicators – these should quantitatively or qualitatively evaluate the project objectives that will be used to evaluate project implementation and effectiveness in meeting objectives. Effectiveness in meeting objectives will need to be evaluated for both habitat changes and when appropriate and feasible, sage-grouse response.
- Identify anticipated site attribute changes in response to the management action, target values, and time frame under which changes are anticipated. Swanson et al. (2006) explain characteristics of useful and effective resource objectives (**S**pecific, **M**easureable, **A**chievable, **R**elevant, and **T**rackable).
- Select monitoring sites and determine appropriate, effective methods. Include control or reference sites in method design. Baseline data on these will allow before, after, with, and without comparisons.
- Monitoring will be conducted for a minimum of three years or until management objects are met. If, as part of the treatment, grazing was restricted for a time period, post-treatment, monitoring should be conducted for three year following resumption of grazing practices. In addition, monitoring will be conducted at 10 years post-treatment as a follow-up for long-term monitoring.
- Any monitoring plans will be prepared jointly between a project proponent, relevant stakeholders (such as permittees), and land management agency, with final approval from the land management agency.

See resources listed at end of this section for development on monitoring plans.

Adaptive Management

Adaptive management as it relates to sage-grouse and their habitats is a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reduce uncertainty over time through continued monitoring. Because adaptive management is based on a learning system, it improves long term management outcomes. The challenge in using the adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcomes based on current knowledge (Allan and Stankey 2009).

> "An adaptive management approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions" (Williams et al. 2009).

Adaptive management takes monitoring to the next level by establishing, prior to implementation, a framework from which an iterative implementation and learning process can be instituted. Adaptive management implements "learning by doing" and provides flexibility to act in the face of uncertainty.

The following are additional steps to monitoring that need to be addressed to successfully implement adaptive management (Adapted from Williams et al. 2009):

- Identify and record potential drivers of change in the system, threats to the system, and opportunities for beneficial actions. These should be incorporated in the model of response for each management action.
- Development of "models" or hypotheses of the expected response and rationale.
- Development of how management actions should be adjusted following results from monitoring (this should include a set of potential alternatives to management based on the outcome of specific monitoring, allowing for flexibility while based on best available science).
- Implementation of iterative adjustments to management actions following implementation of actions and results of monitoring, following the process outlined in previous bullet.
- Project and management plans should incorporate the ability to change methods when monitoring of the projects or management actions indicate or when new science from research or other monitoring project emerges.

Consideration of when adaptive management is appropriate:

- Decision making must be able to be made in an iterative process
- Monitoring data must be available to decision makers
- It is not appropriate when risks associated with learning based-decision making are too high (i.e., if risk of management action is unknown and worst case scenario has irreversible consequences) in comparison to the risks of not doing so (i.e., the consequences of doing nothing).

See resources listed at end of this section for development on adaptive management plans.

Incorporation of Monitoring and Adaptive Management into the State Plan

A multi-scale monitoring approach is necessary as sage-grouse are a landscape species and conservation is scale dependent to the extent that management actions are implemented within or across seasonal habitats to benefit populations. The state should track the extent of threats to sage-grouse (e.g., fire, pinyon-juniper encroachment, etc.), through inventory monitoring, as well as the efforts to manage the threats (e.g., number of acres of pinyon-juniper treated), through management action monitoring to promote effective species management and understand whether the state is making progress towards the goals and objectives outlined in this plan. Many of the components of inventory monitoring are already being monitored by state and federal agencies. The SETT will work to compile annual monitoring reports that provide a synopsis of these monitoring efforts and metrics relevant to the state plans goals and objectives. The state will engage with stakeholders responsible for these components to facilitate when possible and ensure monitoring occurs. For components that are not currently under the purview of other state and federal agencies, the SETT will work to engage relevant stakeholders to develop a monitoring program. The SETT will develop a comprehensive database to store all monitoring information which will be accessible to the public.

To meet the need for the management action monitoring requirement, all management actions overseen by the SEP will develop monitoring plans following guidance provided in this section. If participating in projects developed by BLM/USFS, NDOW, NDA, NDF, or other agencies, projects should include similar aspects to those outlined here, if not all. As well, all management actions should be reviewed and those appropriate for the adaptive management process should additionally develop an adaptive management plan in coordination with the monitoring plan.

Table 9.1 presents the components (sage-grouse threats, habitats, and populations) that will be monitored to be able to better understand the level of threat to sage-grouse and sagebrush ecosystems and what can be done to respond to the threat for sage-grouse. Elements for inventory monitoring and management action monitoring are outlined as well as the relevant agencies from which monitoring information will be gathered. Monitoring information will be collected across the extent of SGMA and provided at the site, landscape, PMU and state levels and by core, priority, and general management areas. In addition, known changes in extent between years will be documented and total extent of treatments will be summarized.

Additional monitoring components may be identified in the future for inclusion in the annual monitoring report (above and beyond those monitoring components listed in Table 9.1). As additional threats to sage-grouse and sage-grouse habitats are identified, components and leading indicators should be included in inventory monitoring and management action monitoring to better assess and understand the severity of threat and progress in ameliorating the threat.

In addition to the annual monitoring report and database, the state of Nevada will develop a methods document for monitoring plans and adaptive management plans that provide recommended, standardized protocols and methods for objective based monitoring that are consistent with other land jurisdictions and agencies, including BLM, USFS, NDOW, and others.

Table 9.1. Inventory and Management Action Monitoring for the State Plan

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
Sage-grouse Parameters			
Sage-grouse habitats	NDOW, BLM, USFS, SETT CCS	• Land Health Assessments (BLM) (site, landscape, and state scale) • Resource Implementation Protocol for Condition Assessment Matrices (USFS) • Sagebrush landscape cover (BLM EIS)[8] (landscape scale) • CCS- functional acres lost due to debit projects, functional acres gained due to credit projects (concept of net conservation gain)	• Treatment conducted and effectiveness of treatments (these would be treatments not included in subsequent monitoring components, e.g., meadow restoration)
Sage-grouse populations	NDOW, BLM, USGS	• Lek, lek cluster, PMU counts, populations and trends (all scales) • Telemetry data collection (site to landscape scale- project dependent)	• At this point, the state plan does not outline management actions directly influencing sage-grouse numbers. Management actions outlined directly affect habitat and indirectly affect populations.
Threat			
Fire	BLM, USFS, NDF, NDOW[9]	• Number of fire starts per year • Number and size of fires in each vegetation community, and resistance and resilience classes	• Number of fires "successfully" suppressed (<1,000 acres) • Number of catastrophic fires • Fuels management treatments (conducted and effectiveness of treatments) • Rehabilitation efforts for each fire (implementation and effectiveness of treatments) • Document coordination efforts that aid in efficient and effective fire pre-suppress and suppression management
Cheatgrass	SETT will coordinate with researchers to	• Extent (spatial distribution, acres, and density of	• Treatments conducted and effectiveness of treatments

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[7] Scale of Management Action Monitoring is dependent on management action details specified in Section 7.0

[8] As part of the Greater Sage-grouse Northern California and Nevada Sub-regional EIS/LUPA, the BLM/USFS have developed a Monitoring Framework (Appendix E of that document) that outlines monitoring for habitat loss, habitat degradation, and population trend (in coordination with NDOW) at the 1st, 2nd, and 3rd order scale (Stiver et al. 2010).

[9] NDOW is engaged with BLM on post -fire treatment monitoring and provides monitoring in conjunction with these agencies post ES&R efforts.

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
	determine extent BLM, USFS, NDOW, Nevada Cheatgrass Action Team	invasion)	(includes restoration efforts or efforts to improve resilience/resistance)
Noxious weeds[10] Medusahead Hoary cress (*Cardaria draba*) Russian knapweed (*Acroptilon repens*) Leafy spurge (*Euphorbia esula*) Perennial pepperweed (*Lepidium latifolium*) Canada thistle (*Cirsium arvense*) Rush skeleton weed (*Chondrilla juncea*) Yellow starthistle (*Centaurea solstitialis*) Musk thistle (*Carduus nutans*) Spotted knapweed (*Centaurea maculosa*) Scotch thistle (*Onopordum acanthium*) Mediterranean sage (*Salvia aethiopis*) **Other weeds** Red Brome (*Bromus rubens*) Rattlesnake chess (*Bromus briziformis*) Halogeton (*Halogeton gomeratus*) Purple mustard (*Chorispora tenella*)	NDA, NDOW, University of Nevada Cooperative Extension, and SETT	• Extent (spatial distribution, acres, and density of invasion)	• Treatments conducted and effectiveness of treatments
Pinyon-Juniper encroachment	BLM, USFS, NDF, NDOW, SETT, all stakeholders (including researchers at University of Nevada, Reno, and USGS)	• Extent (spatial distribution, acres, and density of invasion)	• Treatments conducted and effectiveness of treatments
Predation	NDOW, Wildlife Services, NDA, and SETT,	• Baseline data collected prior to treatments- data will likely be site specific, not SGMA wide (road kill inventories, raven counts, habitat parameters, etc.)	• Treatments conducted and effectiveness of treatments • Documentation of coordination efforts with city counties, landfills waste managers, livestock owners, research on perching and nest deterrent technology
WHB populations	BLM, USFS	• HMA/WHBT populations • Extent of resources	• Gathers conducted • Treatments conducted and

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[10] Weed species in Nevada identified as having, generally, greatest impact to sage-grouse habitats (S. Espinosa, B. Schultz personal communication

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
		damaged by WHB • Understand their timing of use on seasonal habitats • Trend monitoring regarding maintenance of a thriving natural ecological balance for adjusting AML (BLM 2010)	effectiveness of treatments
Livestock grazing	BLM, USFS, permittees and stakeholders	• Allotment standards and guidelines • Dates of use or intensity of use by allotment • Monitoring of attainment of management objectives (Swanson et al. 2006)	• Documentation of changes in management prescriptions to improve management, when appropriate
Anthropogenic disturbances	SETT, BLM, USFS, other federal agencies, all stakeholders	• CCS- functional acres lost due to debit projects, functional acres gained due to credit projects (concept of net conservation gain) • Surface acres impacted • Indirect acres impacted • Identification of existing infrastructure that could be retrofitted, as appropriate (inclusion on the list does not require retrofitting, simply identifying the opportunity)	• Management actions to mitigation for anthropogenic disturbances will be accounted for under the appropriate threat or under habitat and in reporting will be noted as credit projects. • Documentation of implementation of Site Specific Consultation Based Design Features
Recreation and OHVs	SETT, BLM, USFS, Commission on Off-Highway Vehicles and other stake holders	• Permitted activities • Extent of authorized and unauthorized recreational trails and facilities	• Treatments conducted to restore areas impacted by recreational activities and effectiveness of treatments • Documentation of coordination efforts with recreational groups
Weather Variability	NOAA, DRI, State Climatologist, NRCS Water and Climate Center, USGS BLM, USFS, and other stakeholders	• U.S. Drought Monitor • Hydrologic Report • Climate data records (current and historic)	• Tracking changes in management actions due to weather variability
Land Ownership	All agencies	• Tracking of land ownership changes	• Tracking of how changes in management actions due to land ownership affects habitat

Existing monitoring and adaptive management plans and methods

There are several key plans and methods that have been developed for use in Nevada and across the range of the sage-grouse. These should be referenced in the development of resource objectives, management action monitoring plans, and adaptive management plans. The following are recommended for consideration in the State Plan:

Monitoring

Swanson, S., Bruce, B., Cleary, R., Dragt, B., Brackley, G., Fults, G., Linebaugh, J., McCuin, G., Metscher, V., Perryman, B., Tueller, P., Weaver, D. and Wilson, D. 2006. Nevada rangeland monitoring handbook. Second Edition. Educational Bulletin 06-03. University of Nevada Cooperative Extension, Natural Resources Conservation Service, Bureau of Land Management, U.S. Forest Service. USA. 84 pp. Available at: https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf

Stiver, S., Rinkes, E., and Naugle, D. 2010. Sage-grouse Habitat Assessment Framework. U.S. Bureau of Land Management. Unpublished Report. U.S. Bureau of Land Management, Idaho State Office, Boise, Idaho. Available at: http://sagemap.wr.usgs.gov/docs/rs/SG%20HABITAT%20ASESSMENT%202010.pdf

Bureau of Land Management. 2010 Wild Horses and Burros Management Handbook. H-4700-1. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.11148.File.dat/H-4700-1.pdf

BLM AIM Strategy

Toevs, G., Karl, J., Taylor, J., Spurrier, C., Karl, M., Bobo, M., and Herrick, J. 2011. Consistent Indicators and Methods and a Scalable Sample Design to Meet Assessment, Inventory, and Monitoring Information Needs Across Scales. Rangelands: 14-20.

Toevs, G., Taylor, J., Spurrier, C., MacKinnon, W., and Bobo, M. 2011. Bureau of Land Management Assessment, Inventory, and Monitoring Strategy: For Integrated Renewable Resources Management. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/ib_attachments/2012.Par.53766.File.dat/IB2012-080_att1.pdf

BLM AIM Monitoring Methods

Herrick, J., Van Zee, J., Havstad, K., Burkett, L., and Whitford, W. 2009. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. Volume I: Quick Start. Department of Agriculture, Agricultural Research Service, Jornada Experimental Range, Las Cruces, NM. Available at: http://www.ntc.blm.gov/krc/uploads/281/Monitoring%20Manual%20for%20Grassland,%20Shrubland%20and%20Savanna%20Ecosystems%20Vol.%20I_Quick%20Start.pdf

Herrick, J., Van Zee, J., Havstad, K., Burkett, L., and Whitford, W. 2009. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. Volume II: Design, Supplementary Methods and Interpretation. Department of Agriculture, Agricultural Research Service, Jornada Experimental Range, Las Cruces, NM. Available at:

http://www.ntc.blm.gov/krc/uploads/281/Monitoring%20Manual%20for%20Grassland,%20Shrubland%20and%20Savanna%20Ecosystems%20Vol.%20.II.pdf

Adaptive Management

Williams, B., Szaro, R., and Shapiro, C. 2009. Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC. Available at: http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf

Cooperative monitoring

The state of Nevada recognizes the value of monitoring as well as the time and effort required to do so. Given limiting staffing and resources of agencies, the SETT will encourage and facilitate cooperative monitoring by interested stakeholders. The BLM has established a cooperative monitoring agreement for grazing allotment permittees to help conduct rangeland health assessments on their permitted allotments (See Appendix F). In compilation of the first annual monitoring report and through discussions with stakeholders, the SETT will work to develop similar cooperative monitoring agreements for additional resources with additional agencies and will facilitate development of such to meet the needs for training and quality control.

See resources below for monitoring guides for ranchers and other stakeholders.

Oregon Cattlemen's Association (2014). Oregon Resources Monitoring Guide: The Rancher's Guide to Improved Grazing.

Peterson, E. 2010. Implementing a Cooperative Permittee Monitoring Program. Sublette County Extension. University of Wyoming Cooperative Extension Service. B-1169. 28 pp. Available at: http://www.wyoextension.org/agpubs/pubs/B1169.pdf

Swanson, S., Bruce, B., Cleary, R., Dragt, B., Brackley, G., Fults, G., Linebaugh, J., McCuin, G., Metscher, V., Perryman, B., Tueller, P., Weaver, D. and Wilson, D. 2006. Nevada rangeland monitoring handbook. Second Edition. Educational Bulletin 06-03. University of Nevada Cooperative Extension, Natural Resources Conservation Service, Bureau of Land Management, U.S. Forest Service. USA. 84 pp. Available at: https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf

Perryman, B., Bruce, L., Swanson, S., and Tueller, P. (2006). *Rancher's Monitoring Guide* , Educational Bulletin 06-04. University of Nevada Cooperative Extension, University of Nevada, Reno, College of Agriculture, Biotechnology and Natural Resources. USA. 48 pp. Available at: http://www.unce.unr.edu/publications/files/ag/2006/eb0604.pdf

Bureau of Land Management. 2004. Memorandum of Understanding with Public Lands Council. BLM MOU WO220-2004-01. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2006.Par.82823.File.dat/im2006-100attach2.pdf

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APPENDICES

Appendix A:

Site Specific Consultation Based Design Features

Site Specific Consultation Based Design Features

Site Specific Consultation Based Design Features (here after Design Features) are used to minimize impacts to sage-grouse and its habitat due to disturbances on a project by project and site by site basis. Design Features in the State of Nevada's plan apply to all newly proposed projects and modifications to existing projects. Existing projects within SGMA are not currently subject to Design Features; however all Design Features listed below, according to program area, are required to be considered as part of the SETT Consultation process. The State of Nevada recognizes that all Design Features may not be practical, feasible, or appropriate in all instances considering site conditions and project specifications, nor is this list completely exhaustive. Therefore, the SETT in coordination with the project proponent, will consider all of the listed Design Features on a site-specific basis taking into consideration the best available science references for guidance in planning and implementation. If certain Design Features are determined to not be practical, feasible, or appropriate for the specific project site, the SETT will document the reasons the Design Features were not selected. The SETT may also consider additional Design Features that may minimize impacts to sage-grouse and its habitat that are not specifically listed here and document the reasons for selecting the additional Design Features.

Roads

These Design Features apply to all new roads, whether a component of a mining/ energy project or for any other purpose.

- Do not construct new roads where roads already in existence, could be used or upgraded to meet the needs of the project or operation.

- Design roads to an appropriate standard, no higher than necessary, to accommodate their intended purpose and level of use.

- Locate roads outside of key sage-grouse seasonal habitat, such as leks and late brood rearing habitat areas. New roads that are located within 3 miles of a lek should have seasonal restrictions from March 1 to May 15 from 1 hour before sunrise to 9 a.m.

- Coordinate road construction and use among ROW or SUA holders.

- Avoid constructing roads within riparian areas and ephemeral drainages (note that such construction may require permitting under section 401 and 404 of the Clean Water Act).

- Construct road crossings at right angles to ephemeral drainages and stream crossings.

- Work with local governments to enforce speed limits and design roads to be driven at speeds appropriate to minimize vehicle/wildlife collisions.

- Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of remote access technology, such as telemetry and remote well control if applicable (e.g., Supervisory Control and Data Acquisition).

- Restrict vehicle traffic to authorized users on newly constructed routes by employing traffic control devices such as signage, gates, fencing etc.

- Dust abatement on roads and pads will be based on road use, road condition, season, and other pertinent considerations.

- Close and rehabilitate duplicate roads by restoring original landform and establishing desired vegetation, in cooperation with landholders and where appropriate authority exists to do so.

Mineral Resources

Fluid Minerals

Operations

- Cluster disturbances associated with operations and facilities as close as possible, unless site specific conditions indicate that disturbances to sagebrush habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.

- Minimize site disturbance though site analysis and facility planning.

- Use directional and horizontal drilling to reduce surface disturbance.

- Place infrastructure in already disturbed locations where the habitat has not been restored.

- Apply a phased development approach with concurrent reclamation through a coordination process among relevant parties.

- Place liquid gathering facilities outside of Core Management Areas. Have no tanks at well locations within Core Management Areas to minimize truck traffic, and perching and nesting sites for ravens and raptors.

- Pipelines should be under or immediately adjacent to the road.

- Reduce motor vehicle travel during field operations through development and implementation of remote monitoring and control systems plans.

To reduce predator perching, limit the construction of vertical facilities and fences to the minimum number and amount needed.

- Site or minimize linear ROWs or SUAs to reduce disturbance to sage-grouse habitats.

- Co-locate new utility developments (power lines, pipelines, etc.) and transportation routes with existing utility or transportation corridors where adequate spacing separation can be achieved in order to preserve grid reliability and ongoing maintenance capability.

- Bury distribution power lines of up to 35kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

- Power lines, flow lines, and small pipelines should be co-located under or immediately adjacent to existing roads.

- Permanent structures, which create movement (e.g., pump jack) should be designed or sited to minimize impacts to sage-grouse.

- Preclude sage-grouse access to pits and tanks through use of practical techniques (e.g. covers, netting, birdballs, location, etc.).

- Equip tanks and other above-ground facilities with structures or devices that discourage nesting or perching of raptors, corvids, and other predators.

- Control the spread and effects of non-native, invasive plant species Nevada Department of Agriculture listed noxious weeds (NAC 555.010, classes A through C, inclusive) and undesirable non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007) (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance). All projects within SGMA should have a noxious weed management plan in place prior to construction and operations.

- Use only closed-loop systems for drilling operations and no reserve pits.

- Reduce the potential for creating excessive or unintended mosquito habitat and associated risk of West Nile Virus impacts to sage-grouse. This can be implemented through minimizing pit and pond construction and, where necessary, size of pits and ponds (Doherty 2007).

- Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues and West Nile virus has been identified as a concern in the project area, use the following steps for reservoir design to limit favorable mosquito habitat (Dohery 2007):

    – Overbuild size of ponds for muddy and non-vegetated shorelines.

    – Build steep shorelines to decrease vegetation and increase wave actions. Ponds with steep shorelines will be equipped with NDOW approved wildlife escape ramps.

    – Avoid flooding terrestrial vegetation in flat terrain or low lying areas.

    – Construct dams or impoundments that restrict down slope seepage or overflow.

    – Line the channel where discharge water flows into the pond with crushed rock.

    – Construct spillway with steep sides and line it with crushed rock.

    – Treat waters with larvicides to reduce mosquito production where water occurs on the surface if necessary.

- Limit noise to less than 10 decibels above ambient measures one hour before sunrise until 9:00 a.m. within 3 miles of a lek during active lek season, March 1 to May 15 (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

- Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

- Fit new transmission towers with anti-perch devices (Lammers and Collopy 2007).

- Design and construct fences consistent with NRCS fence standards and specifications Code 382 and, where appropriate, use fence markers (Sage Grouse Initiative 2013).

- Locate new compressor stations outside priority habitats. Otherwise design them to reduce noise that may be directed towards priority habitat.

- Implement site keeping practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of sage-grouse (Bui et al 2010).

- Locate man camps outside of priority habitats.

Reclamation

- Include objectives for ensuring habitat rehabilitation to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plans such that goals and objectives are to protect and improve sage-grouse habitat needs.

- Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

- Maximize the area of interim and concurrent reclamation on long-term access roads and well pads, including reshaping, topsoiling and re-vegetating cut-and-fill slopes. In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

- Restore disturbed areas at final reclamation to the near pre-disturbance landforms and the desired plant community.

- Irrigate interim reclamation if necessary for establishing seedlings more quickly and if water rights are available.

- Utilize mulching techniques to expedite reclamation and to protect soils.

- Ensure that all authorized ground disturbing projects have vegetation reclamation standards suitable for the site type prior to construction and ensure that reclamation to appropriate sage-grouse standards are budgeted for in the reclamation bond.

Locatable Minerals

For consistency, sage-grouse Design Features for locatable minerals shall be considered in association with state and federal permitting requirements including bonding, if applicable.

Operations

- Cluster disturbances associated with operations and facilities as close as possible unless site specific conditions indicate that disturbances to sagebrush habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.

- Minimize site disturbance though site analysis and facility planning.

- Place infrastructure in already disturbed locations where the habitat has not been restored.

- Apply a phased development approach with concurrent reclamation through a coordination process among relevant parties.

- Reduce motor vehicle travel during field operations through development and implementation of remote monitoring and control systems plans.

- To reduce predator perching, limit the construction of vertical facilities and fences to the minimum number and amount needed.

- Site or minimize linear ROWs or SUAs to reduce disturbance to sage-grouse habitats.

- Co-locate new utility developments (power lines, pipelines, etc.) and transportation routes with existing utility or transportation corridors where adequate separation can be achieved in order to preserve grid reliability and ongoing maintenance.

- Bury distributive power lines of up to 35 kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

- Preclude sage-grouse access to pits and tanks through use of practical techniques (e.g. covers, netting, birdballs, location, etc.).

- Equip tanks and other above ground facilities with structures or devices that discourage nesting or perching of raptors, corvids, and other predators.

- Control the spread and effects of Nevada Department of Agriculture listed noxious weeds (NAC 555.010, classes A through C, inclusive) and undesirable non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007). All projects within SGMA should have a noxious weed management plan in place prior to construction and operations.

- Reduce the potential for creating excessive or unintended mosquito habitat and associated risk of West Nile Virus impacts to sage-grouse. This can be implemented through minimizing drill and process pit and pond construction and, where necessary, size of drill and process pits and ponds (Doherty 2007).

- Reduce habitat for mosquitoes that vector West Nile virus. If West Nile virus has been identified as a concern in the project area, limit favorable mosquito habitat.

- Limit noise to less than 10 decibels above ambient measures one hour before sunrise until 9:00 a.m. within 3 miles of a lek of a lek during active lek season, March 1 through May 15 (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

- Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

- Fit new transmission towers with anti-perch devices (Lammers and Collopy 2007).

- Design and construct fences consistent with NRCS fence standards and specifications Code 382 and, where appropriate, use fence markers (Sage Grouse Initiative 2013).

- Implement site keeping practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of sage-grouse (Bui et al 2010).

- Locate man camps outside of priority sage-grouse habitats.

Reclamation

- Include objectives for ensuring habitat rehabilitation to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plans such that goals and objective are to protect and improve sage-grouse habitat needs.

- Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

- Maximize the area of interim and concurrent reclamation on infrastructure related disturbances through reshaping/regrading, topsoiling and re-vegetating cut and fill slopes. In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

- Ensure that all authorized ground disturbing projects have vegetation reclamation standards suitable for the site type prior to construction and ensure that reclamation to appropriate sage-grouse standards are budgeted for in the reclamation bond.

- Irrigate interim reclamation as necessary during dry periods when valid water rights exist.

- Utilize mulching techniques to expedite reclamation.

Salable and Non-Energy Minerals

Operations

- Cluster disturbances associated with operations and facilities as close as possible unless site specific conditions indicate that disturbances to sagebrush habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.

- Minimize site disturbance though site analysis and facility planning.

- Place infrastructure in already disturbed locations where the habitat has not been restored.

- Apply a phased development approach with concurrent reclamation through a coordination process among relevant parties.

- Reduce motor vehicle travel during field operations through development and implementation of remote monitoring and control systems plans.

- To reduce predator perching, limit the construction of vertical facilities and fences to the minimum number and amount needed.

- Site or minimize linear ROWs or SUAs to reduce disturbance to sage-grouse habitats.

- Co-locate new utility developments (power lines, pipelines, etc.) and transportation routes with existing utility or transportation corridors where adequate separation can be achieved in order to preserve grid reliability and ongoing maintenance.

- Bury distributive power lines of up to 35 kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

- Preclude sage-grouse access to pits and tanks through use of practical techniques (e.g. covers, netting, birdballs, location, etc.).

- Equip tanks and other above ground facilities with structures or devices that discourage nesting or perching of raptors, corvids, and other predators.

- Control the spread and effects of Nevada Department of Agriculture listed noxious weeds (NAC 555.010, classes A through C, inclusive) and undesirable non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007).. All projects within SGMA should have a noxious weed management plan in place prior to construction and operations.

- Reduce the potential for creating excessive or unintended mosquito habitat and associated risk of West Nile Virus impacts to sage-grouse. This can be implemented through minimizing pit and pond construction and, where necessary, size of pits and ponds Where West Nile virus has been identified as a concern, restrict pond and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).

- Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues and West Nile virus has been identified as a concern in the project area, use the steps described under "Fluid Minerals" for reservoir design to limit favorable mosquito habitat (Doherty 2007).

- Limit noise to less than 10 decibels above ambient measures one hour before sunrise until 9:00 a.m. within 3 miles of a lek during active lek season, March 1 through May 15 (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

- Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

- Fit new transmission towers with anti-perch devices (Lammers and Collopy 2007).

- Design and construct fences consistent with NRCS fence standards and specifications Code 382 and, where appropriate, use fence markers (Sage Grouse Initiative 2013) around sumps.

- Implement site keeping practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of sage-grouse (Bui et al. 2010).

- Locate man camps outside of priority sage-grouse habitats.

Reclamation

- Include objectives for ensuring habitat rehabilitation to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plans such that goals and objective are to protect and improve sage-grouse habitat needs.

- Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

- Reclamation In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

- Maximize the area of interim and concurrent reclamation on infrastructure related disturbances through reshaping/regrading, topsoiling and re-vegetating cut and fill slopes. In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

- Ensure that all authorized ground disturbing projects have vegetation reclamation standards suitable for the site type prior to construction and ensure that reclamation to appropriate sage-grouse standards are budgeted for in the reclamation bond.

- Restore disturbed areas at final reclamation to near pre-disturbance landform and the desired plant community.

- Irrigate interim reclamation as necessary during dry periods when valid water rights exist.

- Utilize mulching techniques to expedite reclamation.

Fuels and Fire Management and Post-Fire Rehabilitation

- Fire and fuels operations should focus on protecting and enhancing occupied sage-grouse habitats. This includes taking into account the feasibility and cost of future rehabilitation efforts during Wildland Fire Decision Support Tree planning and general fire operations in all occupied sage-grouse habitats

Fuels Management

- Design fuels treatment objective to protect existing sagebrush ecosystems, modify fire behavior, restore ecological function, and create landscape patterns which most benefit sage-grouse habitat.

- Incorporate resilience and resistance and other best available science concepts into fuels treatment planning activities

- Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas used locally.

- Fuels treatment project design in sagebrush and pinyon-juniper encroached sagebrush habitats must be based on the best available science. At a minimum, project proponents will consider best available science including: use of site appropriate state and transition models; ecological site characteristics; and, the evaluation of resilience to disturbance and resistance to invasive annual grasses.

- Ensure the proposed prescription burning plans meet the need of the resource via a comprehensive review by proponents, fire managers, wildlife biologists and resource managers, at a minimum.

- Use prescriptive fire use on project sites where state and transition models, ecological site descriptions and existing high site resilience/resistance are used as principle components of the prescription planning process. The desired outcome of all prescription fire use in appropriate sagebrush habitat is to minimize undesirable long-term effects on vegetation or soils (e.g., minimize mortality of desirable perennial herbaceous species and reduce risk of annual grass invasion).

- Ensure proposed sagebrush treatments are planned with full interdisciplinary input pursuant to NEPA and coordination with NDOW and SETT, and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.

- Ensure that treatments are configured in a manner that promotes use by sage-grouse.

- Incorporate roads and natural fuel breaks into fuel break design

- Utilize supervised livestock grazing as a tool to reduce fuels and control non-native species. Targeted grazing needs to be conducted within the framework of the sage-grouse desired habitat conditions (Table 4-1).

- Power-wash all vehicles and equipment involved in fuels management activities prior to entering the area to minimize the introduction of undesirable or invasive plant species.

- Design vegetation treatments in areas of high fire frequency, which facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat. Additionally, develop maps for sage-grouse habitat, which spatially display existing fuels treatments that can be used to assist suppression activities.

- For implementing specific sage-grouse habitat rehabilitation projects in annual grasslands, first give priority to sites which are adjacent to or surrounded by Core Management Areas or that reestablish continuity between priority habitats. Annual grasslands are a second priority for rehabilitation when the sites are not adjacent to Core Management Areas, but within two miles of Core Management Areas. The third priority for annual grassland habitat restoration projects are sites beyond two miles of Core Management Areas. The intent is to focus restoration outward from existing, intact habitat. Within these criteria, projects should be prioritized based on probability of success based on current condition, ecological site and state-and-transition modeling if available.

- As funding and logistics permit, rehabilitate annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs with the goal of establishing a functional ecological site based on state-and-transition modeling and ecological site descriptions..

- Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions

- Based on ecological site descriptions, remove encroaching pinyon and juniper trees from areas within at least 3 kilometers (1.86 miles) of occupied sage-grouse leks (Connelly et al. 2000) and from other limiting habitats at least 850 meters (e.g., nesting, wintering and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit (Connelly et al 2000, Casazza et al. 2011).

- Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.

- Reduce the risk of vehicle- or human-caused wildfires and the spread of invasive species by installing and maintaining fuel breaks or planting perennial vegetation (e.g., green-strips) paralleling road rights-of-way. Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, targeted grazing, etc.) to aid in controlling wildfire, should wildfire occur near SGMA or important restoration areas (such as where investments in restoration have already been made).

- All fuels management projects should include short and long term monitoring to ensure success and provide for adaptive management. Multiple re-vegetation entries may be required to ensure success.

Fire Management

- Compile state and local government/District/Forest level information into state-wide sage-grouse tool boxes. Tool boxes will contain maps, listing of state and local resource advisors, contact information, local guidance, and other relevant information for each state and local government/District/Forest, which will be aggregated into a state-wide document. Update the toolbox annually or continually.

- Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.

- Assign a state or local resource advisor with sage-grouse expertise, or who has access to sage-grouse expertise, to all extended attack fires in or near sage-grouse habitat. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve state wildlife agency expertise in fire operations through:

  – instructing resource advisors during preseason trainings;

  – qualification as resource advisors;

  – coordination with resource advisors during fire incidents;

  – contributing to incident planning with information such as habitat features or other key data useful in fire decision making.

- On critical fire weather days, pre-position additional local, state, and federal fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.

- Encourage local resources (volunteer fire departments and country equipment) to respond to initial attack efforts and further encourage these agencies to obtain required ICS training to be able to run incidents for longer periods when needed during critical fire periods.

- During periods of multiple fires, ensure line officers, in consultation with state and local resource advisors are involved in setting priorities.

- To the extent possible, locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, heli-bases, etc.) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.

- Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATV) prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.

- Minimize burnout operations in key sage-grouse habitat areas by constructing direct fire line whenever safe and practical to do so.

- Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack.

- As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.

- Adequately document fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

- Coordinate and utilize local fire suppression resources to the maximum extent possible.

- Eliminate “burning out” islands and fingers of unburned sage-grouse habitat, unless lives and property are at risk.

Post-Fire Rehabilitation

- Emphasis should be on fall re-vegetation to ensure greatest likelihood of success.

- All post-fire rehabilitation projects should include short- and long-term monitoring to ensure success and provide for adaptive management. Multiple re-vegetation entries may be required to ensure success. Emphasize the use of native plant species in post-fire rehabilitation, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions. Selected species maintain site ecological function based on pre-burn conditions and anticipated threat of invasive and noxious weed establishment. Use ecological site descriptions and state-and-transition models if available.

- Reseed all burned areas requiring rehabilitation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

- Power-wash all vehicles and equipment prior to entering sage-grouse habitat rehabilitation/restoration areas to minimize noxious weed spread. Minimize unnecessary cross-country vehicle travel during rehabilitation/restoration operations in sage-grouse habitat.

- Consider Integrated Pest Management (IPM) practices to ensure greater initial control of invasive and noxious plant species.

- Sage-grouse seasonal habitat requirements must be considered when selecting re-vegetation materials in all burned potential and current sage-grouse habitat.

- Prioritize shrub island plantings in large burn areas which may lack sufficient shrub seed sources, in order to ensure the reestablishment of the shrub component.

Vegetation Management

- Avoid sagebrush removal in sage-grouse breeding or wintering habitats.

- Maintain all remaining large intact sagebrush patches, particularly at low elevations, through active management, in order to increase resistance and resilience to reduce the risk of being lost to wildfire.

- Limit habitat treatments in winter ranges to actions that maintain or expand current or needed levels of sagebrush available in winter.

Lands and Realty

Leases and Permits

- Permits and leases must include stipulations to minimize impacts to sage-grouse and sage-grouse habitats based upon the specific activity and ensure no net loss of sage-grouse habitat.

Right-of-Ways (ROWs)

- Work with existing rights-of-way holders to encourage installation of perch guards on all poles where existing utility poles are located within 5 km (3.2 miles) of known leks (Coates et al. 2013).

- Use existing utility corridors and consolidate rights-of-way to reduce habitat loss, degradation, and fragmentation. Install new power lines within existing utility corridors.

- Where sage-grouse conservation opportunities exist, BLM field offices and Forests should work in cooperation with rights-of-way holders to conduct maintenance and operation activities, authorized under an approved ROW grant, to avoid and minimize effect on sage-grouse habitat.

- When renewing or amending ROWs, assess the impacts of ongoing use of the ROW to sage-grouse habitat and incorporate stipulations, which minimize such impacts to the extent allowed by law.

- Conduct pre-application meetings with the BLM or Forest Service and SETT for all new ROW proposals consistent with the ROW regulations (43 CFR 2804.10) and consistent with current renewable energy ROW policy guidance (WO-IM-2011-061, issued February, 2011). Assess the impact of the proposed ROW on sage-grouse and its habitat, and implement the following: Ensure that reasonable alternatives for siting the ROW outside of sage-grouse habitat or within a BLM designated utility corridor are considered and analyzed in the NEPA document; and identify technically feasible best management practices, conditions, (e.g., siting, burying power lines) that may be implemented in order to eliminate or minimize impacts.

- Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, top-soiling and re-vegetating cut and fill slopes.

- Authorize ROWs for wind energy development projects by applying appropriate Design Features as specified in the BLM Wind Energy Development EIS (BLM 2005), land use restrictions, stipulations, and mitigation measures.

- Bury distribution power lines of up to 35kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

- Where existing leases or rights-of-way (ROWs) have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features, without interfering with valid pre-existing rights, and restoring the habitat.

- Within designated ROW corridors encumbered by existing ROW authorizations: new ROWs should be co-located to the extent practical and feasible with the entire footprint of the proposed project adjacent to or within the existing disturbance associated with the authorized ROWs taking into account operational requirements and safety.

- Subject to valid, existing rights, where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes sage-grouse impacts. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the minimum standard necessary.

- Upon project completion, roads used for commercial access on public lands would be reclaimed, unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.

- Construct new power lines outside of sage-grouse habitat wherever possible. If power lines cannot be sited outside of sage-grouse habitat, site power lines in the least suitable habitat possible or bury power lines, where technology and economic factors allow.

- Remove power lines that traverse important sage-grouse habitats when facilities being serviced are no longer in use or when projects are completed.

- Install anti-perching and anti-nesting measures on new tall structures, such as power lines, commensurate with the design of the structures.

Travel and Transportation

- Work with local government to enforce speed limits and design roads to be driven at speeds appropriate to minimize vehicle/wildlife collisions.

- Conduct rehabilitation of roads, primitive roads, and trails not designated in travel management plans where such plans exist and have been approved for implementation. This also includes primitive route/roads that were not designated in wilderness study areas and within lands managed for wilderness characteristics that have been selected for protection, with due consideration given to any historical significance of existing trails.

- When reseeding roads, primitive roads, and trails, use appropriate seed mixes and consider the use of transplanted sagebrush in order to trend towards achieving sage-grouse desired habitat conditions (Table 4-1). Where invasive annual grasses are present, herbicides may be used to enhance the effectiveness of any seeding and to also establish islands of desirable species for dispersion.

- Use existing roads, or realignments to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then any new roads would be constructed to the minimum standard necessary to support the intended use.

- Work with local governments to minimize upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on sage-grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road, while providing for the intended use.

- Manage on-road travel and OHV use in key grouse areas to avoid disturbance during critical times such as winter and nesting periods.

- Consider road removal, realignment, or seasonal closures where appropriate to avoid degradation of habitat and /or to avoid disturbance during critical periods of the sage-grouse life cycle.

Recreation

- Special recreation permits must have stipulations to minimize impacts to sage-grouse and sage-grouse habitat based upon the specific activity and ensures net conservation gain of sage-grouse habitat.

- Issue special recreation permits with appropriate distance and timing restrictions to minimize impacts to seasonal sage-grouse habitat.

- Develop trail mapping, and educational campaigns to reduce recreational impacts on sage-grouse, including effects of cross country travel.

- Where feasible, locate recreation trails strategically to create or augment fuel breaks in the margins of sage-grouse habitats and landscapes and not create roads or trails where they cause net negative direct and indirect impacts.

- Take measures to minimize or reduce activities and to avoid an ambient noise level increase >10 dB at the edge of leks during the lekking season generally, March 1 through May 15 from one hour before sunrise until 9:00 a.m. (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

Energy Development and Infrastructure

- Adopt standards outlined in *Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and Their Habitats,* April 2010, pgs. 25-29 (Appendix G).

Wild Horses and Burros

- When conducting NEPA analysis for wild horse and burro management activities, water developments or other rangeland improvements for wild horses in sage-grouse habitat, address the direct and indirect effects to sage-grouse populations and habitat. Implement any water developments or rangeland improvements using the criteria for wild horses and burros year around use and ensure that it is consistent with the necessary rights and right of ways in sage-grouse habitats. Incorporate the NRCS water development standards and additional criteria listed below, including Codes 614, 574, 533, 642, and 516.

Livestock Grazing and Range Management

• Where applicable and as part of a ranch management plan, use the Natural Resource Conservation Service (NRCS) Conservation Practice Standards and Specification listed below[11]. In addition, use the recommendations additions to the standards developed by NRCS and NDOW as part of NRCS' Sage-grouse Initiative and further expanded by the state of Nevada in this document:

- Code 645: Upland Wildlife Habitat Management
- Code 528: Prescribed Grazing
    - Emphasize rest periods or seasonal deferment when appropriate as part of the grazing management plan and restoration.
- Code 614: Water Facilities
    - Avoid placement where existing sagebrush cover will be reduced near a lek, in nesting habitat, or winter habitat whenever possible. NDOW recommends structures be at least 1 mile from a lek.
- Code 574: Spring Development
    - Springs may be developed as long as valid water claims or rights exist and development shows a net benefit to overall habitat management within a SGMA.
- Code 533: Pumping Plant
    - NDOW recommends the structure should not be placed within 3 miles of a lek to avoid disturbance to nesting sage-grouse.
- Code 642: Water Well
    - Well placement should encourage dispersion of livestock and provide for a neutral or no net negative impact to habitat within a SGMA. Further water developments will decrease concentrated livestock and wildlife use and further protect sagebrush habitats.
- Code 516: Livestock Pipeline
    - Pipelines shall be replaced as needed to provide for better dispersion of livestock.
    - Pipelines shall be replaced along existing pipelines, roadways, or fences.
    - Replacement and maintenance of pipelines shall use the least invasive techniques and extensive work requiring heavy equipment shall be done in a manner consistent with season of use by the sage-grouse (i.e. replacing improvements in sage-grouse winter habitat during the summer and replacing improvements in breeding and nesting habitat during the fall)
    - Replacement of improvements shall be allowed in order to not jeopardize existing and valid claims and rights.
- Code 410: Grade Stabilization Structure
    - If possible, avoid the installation of these structures during the late summer brood rearing period. NDOW recommends structure placement in mid-September through late November.
- Code 382: Fence
    - If possible, fencing should not be constructed near a lek and should be avoided in winter habitats near ridges. To make a fence more visible, use white tipped metal fence posts,

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[11] These USDA; NRCS Conservation Practice Codes as well as others can be found at: http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/references/?cid=nrcs143_026849

securing flagging or reflectors to the top fence wires, or slide sections of PVC pipe over the top wire (Stevenson and Reece 2012).

- Relocate or modify existing water developments (including locating troughs to further disperse livestock) that are having a net negative impact on sage-grouse habitats. Any changes to existing water developments must be conducted in accordance with State Water Law and in close consultation with the water right owner in order to avoid a "taking" of private property water rights.

- All troughs should be outfitted with the appropriate type and number of wildlife escape ramps.

- All field and district offices should apply BLM IM 2013-094 or similar methodology until superseded related to drought management planning.

Surface Disturbing Activities – General

- During the period specified, based upon site-specific conditions manage discretionary surface disturbing activities and uses to prevent disturbance to sage-grouse during life cycle periods. Seasonal protection is identified for the following:

  -Seasonal protection within three (3) miles of active sage-grouse leks from March 1 through June 15 during lekking hours of 1-hour before sunrise until 9:00 a.m.

  -Seasonal protection of sage-grouse suitable wintering areas from November 1 through March 31;

  -Seasonal protection of sage-grouse suitable brood-rearing habitat from May 15 to August 15.

- Implement appropriate time-of-day or time-of year restrictions for future construction or maintenance activities in known sage-grouse habitat

- Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

- Minimize the footprint of disturbances to avoid or minimize the potential for invasive plant infestations. When possible, do not remove native vegetation. Monitor, report, and treat all disturbance sites that become occupied by invasive plants, primarily cheatgrass, and all state listed noxious weeds. Pre- and post-disturbance activities must include prevention strategies prior to entering sites. Treatments, restoration, and monitoring are required for a minimum of three years or until the site is deemed noxious and invasive weed free following the disturbance. Reporting should be sent to the Nevada Department of Agriculture via the EDDMapS link on their website.

- Maximize the area of interim reclamation on long-term surface disturbing activities to including reshaping, top-soiling and re-vegetating areas no longer being disturbed within the overall project foot print.

Miscellaneous

- In Wilderness and Wilderness Study Areas (WSA), the state of Nevada will work with the federal land management agencies to investigate the use of mechanized equipment in those areas in conformance with the Wilderness Act, Federal Land Policy and Management Act, and National Forest Management Act. The State will also support congressional efforts to investigate and responsibly use additional techniques (including mechanized) to protect or restore areas that exhibit unique or emergency circumstances (fire, P/J expansion, invasive weeds infestations, excessive fuels, etc.) in order to protect the area from long term resource damage..

- Work with federal, state, and local governments and project proponents to minimize anthropogenic subsidies for predators, including ravens.

Appendix B:

Development Process and Justification for Desired Habitat Conditions

for Greater Sage-Grouse in Nevada

Greater Sage-Grouse Proposed Desired Habitat Conditions

Questions and Answers

1. How were the Proposed Desired Habitat Conditions for GRSG developed?
   The proposed Desired Habitat Conditions are a synthesis of existing data across the state of Nevada and portions of the Bi-State in California. The U.S. Geological Survey was primarily responsible for much of the synthesis and in translating often complex habitat relationships and GRSG responses into the proposed desired habitat conditions which could be summarized and applied on the ground. A team consisting of representatives from the U.S. Fish and Wildlife Service, BLM, Nevada Department of Wildlife, and U.S. Forest Service reviewed the Connelly et al. 2000 guidelines and also reviewed a bibliography of Nevada-based research made available by the U.S. Geological Survey. The team then went through each Connelly et al. 2000 guideline and reviewed it with respect to localized data. The Connelly et al. 2000 guidelines remained as a default unless refined by new information. In March 2015, the Science Work Group met and further revised the State Plan section 4.0 and the desired habitat conditions table.

2. Why are the Proposed Desired Habitat Conditions for GRSG different from Connelly et al. 2000 guidelines?
   The Connelly et al. 2000 guidelines were a strong synthesis of research until that time. The guidelines themselves suggest that studies which define GRSG habitat on a more region-specific basis should be used where supported by research. These proposed desired habitat conditions respond to more localized data than the Connelly et al. 2000 guidelines, which relied heavily on data from the eastern half of the range of GRSG where a perennial grass component is more dominant, and where large-scale ecological changes such as invasive grasses and conifer encroachment are largely absent. The proposed desired habitat conditions reflect those differences.

3. What are the differences between the Proposed Desired Habitat Conditions for GRSG and Connelly et al. 2000 guidelines?
   While numerous differences exist, they are driven primarily by three elements: 1) the reduced role of perennial grasses for nest concealment as revealed by many nesting habitat studies throughout Nevada; 2) the increased habitat fragmentation and degradation as a result of invasive grasses and conifer encroachment; and 3) the elevated importance of late-summer brood-rearing habitats in the lower precipitation zones of Nevada. The proposed desired habitat conditions also reflect recent research into more complex aspects of habitat juxtaposition, such as the interspersion of meadow habitat with adjacent sagebrush cover, and the attempt to quantify other scale-dependent relationships such as the degree of conifer encroachment.

4. Are the Proposed Desired Habitat Conditions for GRSG supported by science?
   The proposed desired habitat conditions are supported by numerous studies throughout Nevada from the Bi-State area in southwestern Nevada and California through the Elko District into northeastern Nevada. Much of the synthesis of research which resulted in these proposed desired habitat conditions for GRSG was conducted by the U.S. Geological Survey.

5. Are the Proposed Desired Habitat Conditions for GRSG consistent with the BLM National Technical Team report (NTT)?

   The NTT report suggests the use of local and state seasonal GRSG desired habitat conditions when they are available and references the habitat recommendations from Connelly et al. 2000 if they are not.

6. What is the rationale for eliminating the residual cover standard (7 in/18cm) from GRSG nesting habitat?

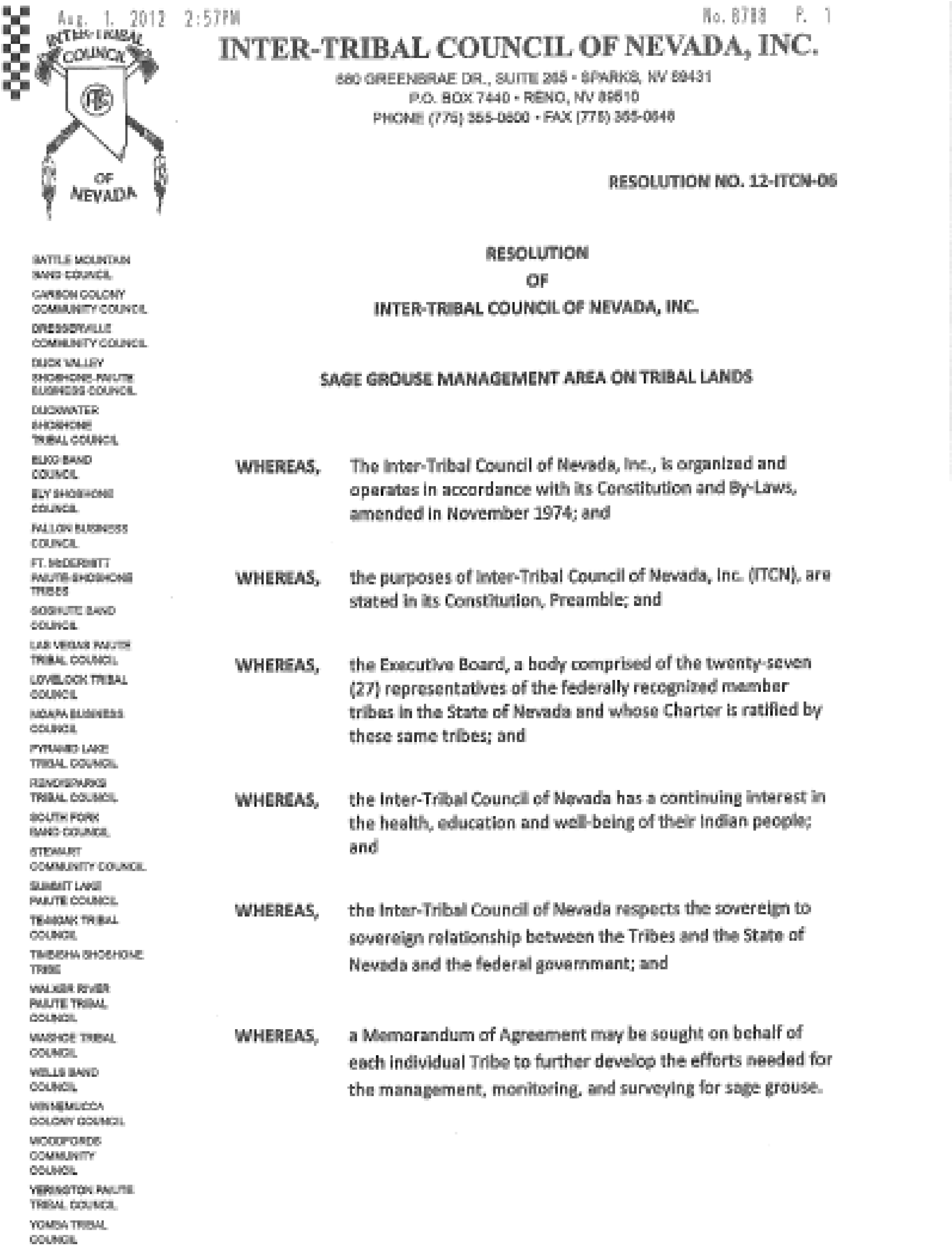
   Localized data indicate that sagebrush canopy cover was the primary indicator of nesting success within Nevada. Research indicates that the primary deterrent to successful nesting was predation, specifically by common ravens, an aerial predator. Thus, the research demonstrated that overhead concealment was the primary indicator of nesting success and that the lateral concealment component of perennial grasses drove nesting success only when sagebrush canopy was deficient.

7. What is the difference between tall trees and power lines?

   These differ in degree of impact. Generally, power lines are larger and have much greater visibility. They contribute to fragmentation and provide potential predators with larger scale, more pervasive access to habitats.

Appendix C:

Inter-Tribal Council of Nevada Resolution



Aug. 1. 2012 2:57PM No. 8788 P. 1

INTER-TRIBAL COUNCIL OF NEVADA, INC.
680 GREENBRAE DR., SUITE 265 • SPARKS, NV 89431
P.O. BOX 7440 • RENO, NV 89510
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BATTLE MOUNTAIN BAND COUNCIL
CARSON COLONY COMMUNITY COUNCIL
DRESSLERVILLE COMMUNITY COUNCIL
DUCK VALLEY SHOSHONE-PAIUTE BUSINESS COUNCIL
DUCKWATER SHOSHONE TRIBAL COUNCIL
ELKO BAND COUNCIL
ELY SHOSHONE COUNCIL
FALLON BUSINESS COUNCIL
FT. McDERMITT PAIUTE-SHOSHONE TRIBES
GOSHUTE BAND COUNCIL
LAS VEGAS PAIUTE TRIBAL COUNCIL
LOVELOCK TRIBAL COUNCIL
MOAPA BUSINESS COUNCIL
PYRAMID LAKE TRIBAL COUNCIL
RENO/SPARKS TRIBAL COUNCIL
SOUTH FORK BAND COUNCIL
STEWART COMMUNITY COUNCIL
SUMMIT LAKE PAIUTE COUNCIL
TE-MOAK TRIBAL COUNCIL
TIMBISHA SHOSHONE TRIBE
WALKER RIVER PAIUTE TRIBAL COUNCIL
WASHOE TRIBAL COUNCIL
WELLS BAND COUNCIL
WINNEMUCCA COLONY COUNCIL
WOODFORDS COMMUNITY COUNCIL
YERINGTON PAIUTE TRIBAL COUNCIL
YOMBA TRIBAL COUNCIL

RESOLUTION NO. 12-ITCN-06

RESOLUTION
OF
INTER-TRIBAL COUNCIL OF NEVADA, INC.

SAGE GROUSE MANAGEMENT AREA ON TRIBAL LANDS

WHEREAS, The Inter-Tribal Council of Nevada, Inc., is organized and operates in accordance with its Constitution and By-Laws, amended in November 1974; and

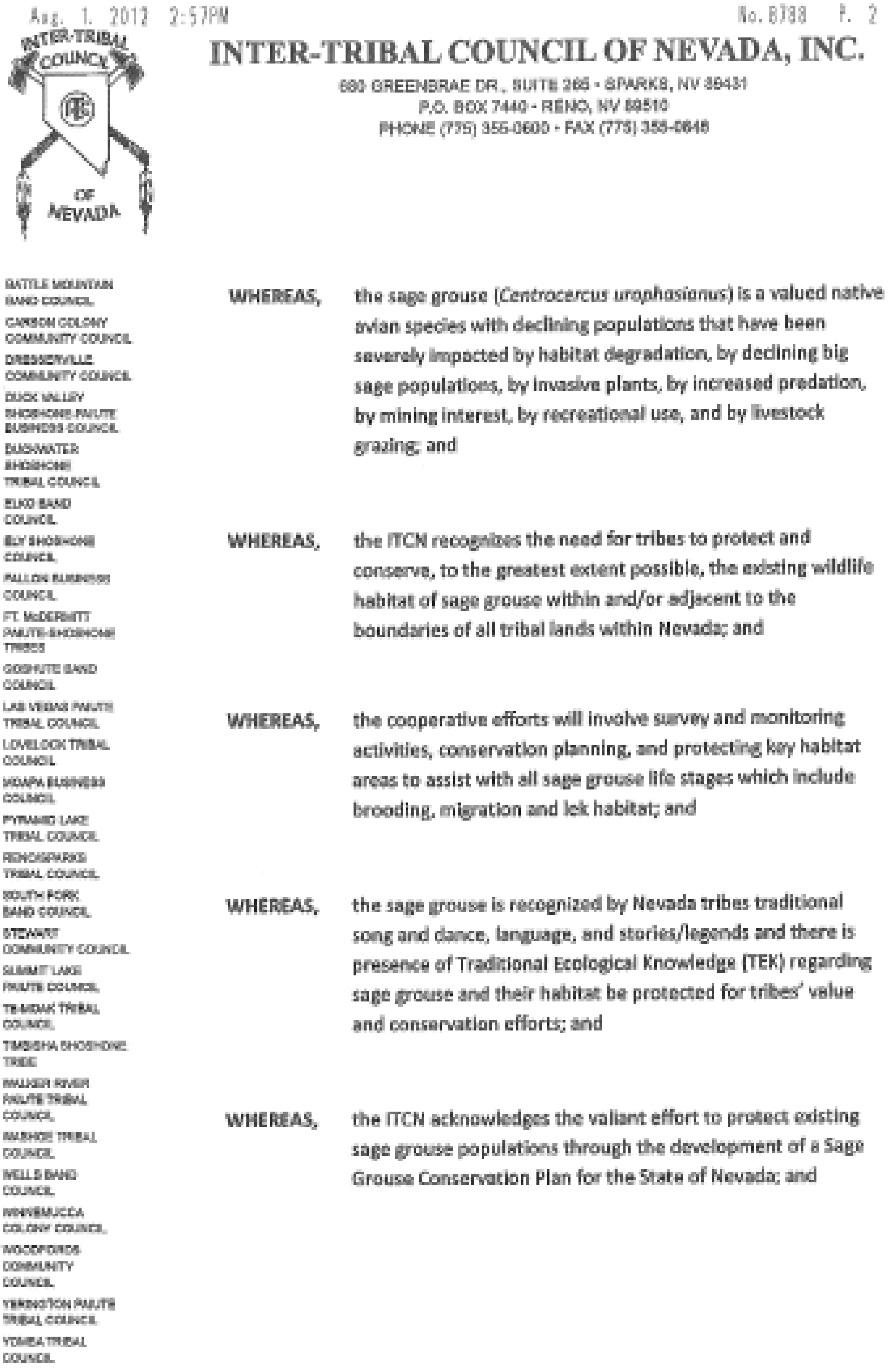
WHEREAS, the purposes of Inter-Tribal Council of Nevada, Inc. (ITCN), are stated in its Constitution, Preamble; and

WHEREAS, the Executive Board, a body comprised of the twenty-seven (27) representatives of the federally recognized member tribes in the State of Nevada and whose Charter is ratified by these same tribes; and

WHEREAS, the Inter-Tribal Council of Nevada has a continuing interest in the health, education and well-being of their Indian people; and

WHEREAS, the Inter-Tribal Council of Nevada respects the sovereign to sovereign relationship between the Tribes and the State of Nevada and the federal government; and

WHEREAS, a Memorandum of Agreement may be sought on behalf of each individual Tribe to further develop the efforts needed for the management, monitoring, and surveying for sage grouse.



Aug. 1. 2012 2:57PM No. 8788 P. 2

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LOVELOCK TRIBAL COUNCIL
MOAPA BUSINESS COUNCIL
PYRAMID LAKE TRIBAL COUNCIL
RENO-SPARKS TRIBAL COUNCIL
SOUTH FORK BAND COUNCIL
STEWART COMMUNITY COUNCIL
SUMMIT LAKE PAIUTE COUNCIL
TE-MOAK TRIBAL COUNCIL
TIMBISHA SHOSHONE TRIBE
WALKER RIVER PAIUTE TRIBAL COUNCIL
WASHOE TRIBAL COUNCIL
WELLS BAND COUNCIL
WINNEMUCCA COLONY COUNCIL
WOODFORDS COMMUNITY COUNCIL
YERINGTON PAIUTE TRIBAL COUNCIL
YOMBA TRIBAL COUNCIL

WHEREAS, the sage grouse (*Centrocercus urophasianus*) is a valued native avian species with declining populations that have been severely impacted by habitat degradation, by declining big sage populations, by invasive plants, by increased predation, by mining interest, by recreational use, and by livestock grazing; and

WHEREAS, the ITCN recognizes the need for tribes to protect and conserve, to the greatest extent possible, the existing wildlife habitat of sage grouse within and/or adjacent to the boundaries of all tribal lands within Nevada; and

WHEREAS, the cooperative efforts will involve survey and monitoring activities, conservation planning, and protecting key habitat areas to assist with all sage grouse life stages which include brooding, migration and lek habitat; and

WHEREAS, the sage grouse is recognized by Nevada tribes traditional song and dance, language, and stories/legends and there is presence of Traditional Ecological Knowledge (TEK) regarding sage grouse and their habitat be protected for tribes' value and conservation efforts; and

WHEREAS, the ITCN acknowledges the valiant effort to protect existing sage grouse populations through the development of a Sage Grouse Conservation Plan for the State of Nevada; and

INTER-TRIBAL COUNCIL OF NEVADA

INTER-TRIBAL COUNCIL OF NEVADA, INC.
680 GREENBRAE DR., SUITE 265 • SPARKS, NV 89431
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PHONE (775) 355-0600 • FAX (775) 355-0648

BATTLE MOUNTAIN BAND COUNCIL
CARSON COLONY COMMUNITY COUNCIL
DRESSLERVILLE COMMUNITY COUNCIL
DUCK VALLEY SHOSHONE-PAIUTE BUSINESS COUNCIL
DUCKWATER SHOSHONE TRIBAL COUNCIL
ELKO BAND COUNCIL
ELY SHOSHONE COUNCIL
FALLON BUSINESS COUNCIL
FT. McDERMITT PAIUTE-SHOSHONE TRIBES
GOSHUTE BAND COUNCIL
LAS VEGAS PAIUTE TRIBAL COUNCIL
LOVELOCK TRIBAL COUNCIL
MOAPA BUSINESS COUNCIL
PYRAMID LAKE TRIBAL COUNCIL
RENO/SPARKS TRIBAL COUNCIL
SOUTH FORK BAND COUNCIL
STEWART COMMUNITY COUNCIL
SUMMIT LAKE PAIUTE COUNCIL
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WELLS BAND COUNCIL
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YERINGTON PAIUTE TRIBAL COUNCIL
YOMBA TRIBAL COUNCIL

WHEREAS, the ITCN Executive Board endorses the attachment 1 of approved language that would be updated into the final State of Nevada Sage Grouse Conservation Plan.

NOW THEREFORE BE IT RESOLVED that the Executive Board, on behalf of their membership, hereby supports the statewide Sage Grouse Conservation Plan effort by including any applicable Nevada tribal lands within Sage Grouse Management Areas through a Memorandum of Agreement for direct involvement for the purposes of monitoring, surveying, developing recommended conservation measures, funding, and protecting the sage grouse and its sagebrush habitat.

CERTIFICATION

The foregoing resolution was adopted by poll vote of the Inter-Tribal Council of Nevada's Executive Board, completed on the 25th day of July, 2012, by a

Vote of __12__ FOR, __0__AGAINST, and__0__ ABSTENTIONS.

Daryl Crawford, ITCN Executive Director
for
Bryan Cassadore, Secretary
ITCN Executive Board

Appendix D:

Cooperation of State and Federal Agencies for Depredation Permits for Common Raven

Cooperation of State and Federal Agencies for Depredation Permits for Common Raven

The USFWS can authorize depredation permits for the 'take' of common ravens, which are protected under the Migratory Bird Treaty Act. Currently in the State of Nevada, there are permits that authorize the 'take' of approximately 5,000 ravens annually, which constitutes five percent of the estimated 100,000 resident ravens (2003 estimate, Wildlife Services) in Nevada. NDOW is authorized to take 2,500 ravens; USDA-APHIS-Wildlife Services (WS) is authorized to take 1,500, and other private sources around 1,000. NDOW's permit is specifically authorized for the protection of sage-grouse and other game species. WS' permit is authorized for the protection of livestock. Other permits are authorized for the protection of property, public health and welfare (power companies, landfills, etc.). The most recent population estimate for Nevada is 190,000 ravens (2013 estimate, WS). This may potentially lead to an increase in permit allocations in the future if they can be justified

WS is a federal agency that works cooperatively with the Nevada Department of Agriculture's Division of Animal Industry. Its primary objective is to protect livestock and farming interests from damage caused by predators or other nuisance species. WS is authorized to perform their duties on federal land and may enter into agreements with state, tribal, county, or private landowners to conduct their business. Predator control is a major component of their duties.

Specific to ravens, WS certified applicators are the only ones authorized by the EPA to either apply or directly supervise those applying the avicide DRC-1339 to execute the federal depredation permit authorized by the USFWS for the taking of migratory birds.

Currently, WS and NDOW are working jointly to reduce raven densities with the aim to enhance sage-grouse recruitment rates, which can be affected by raven predation of sage-grouse eggs and chicks. NDOW designates priority areas for treatment and WS treats hard-boiled chicken eggs with DRC-1339 and places them within the priority areas. Monitoring and data collection is done by both agencies as well as other partners to inform future implementation of the program and determine the efficacy of the protocols used.

Appendix E:

Process to Prioritize Integrated Predator Management Projects

Process to Prioritize Integrated Predator Management Projects

The following frame work will be used to prioritize where Objective 1.1, 1.2, and 1.3 are implemented across the state.

Step 1: State level mapping for ravens and sage-grouse. This should be an ongoing process updated every few years.

a. Contract with USGS to conduct landscape level modeling to estimate location of high raven occupancy (following methods for Raven Selection Probability Function (RSPF) as described in Coates et al., In Review).
   If funding is not available to conduct modeling, regional biologists would submit areas of concern for evaluation.

b. Conduct modeling of sage-grouse nesting habitat

c. Intersect areas of raven concern with areas of sage-grouse nesting habitat. Select 5-15 sites to be evaluated at the site level. Until map of nesting habitat for sage-grouse in Nevada is available, the Core Management Area should be used.

Step 2: Site level analysis. This step should be conducted annually.

a. Conduct raven surveys at 5-15 sites identified during Step 1 following a selected raven survey protocol to determine raven densities.
b. Evaluate sage-grouse demographic data, as available, to determine if nest success is a limiting factor. Areas identified for potential raven removal should be prioritized for sage-grouse demographic data collection as feasible.
c. Use information from the above two steps to identify 2-5 project sites for Integrated Predator Management around the State. Sites that have identified nest success as limiting to the populations due to raven predation should be prioritized for treatment. Sites that have greater than 0.46 ravens per km^2 should be prioritized for treatment (Coates et al., In Review). Exact number of project locations should be determined by number of raven take permits available, funding for projects, and personnel to carry out work.

Once Prioritized Integrated Predator Management Project locations are identified, the following steps should be completed.

1. Develop Integrated Predator Management Program for each project location.
    a. Develop anthropogenic subsidies control plan for project location following recommendations in Predation Goal 1 Objective 1.
    b. Develop habitat integrity improvement plan for project location recommendations in Predation Goal 1 Objective 2.
    c. Develop predator control plan for project location following recommendations in Predation Goal 1 Objective 3.
        i. Develop treatment regime for project area

        1. Determine/set parameters of predator control area (where damage is occurring)
        2. Determine/set parameters of predator control project timing (when resource is vulnerable)
        3. Establish species to be targeted and methods/techniques which are acceptable
        4. Determine what constitutes a “corrected” situation (when does project end, e.g. stop lethal control once raven density is below density thresholds or a lack of population response to actions is determined)
    ii. Establish predator monitoring regimes
        1. Pre-treatment monitoring of predator numbers (frequency, number & type).
        2. Treatment monitoring of predator numbers (frequency, number & type).
        3. Post-treatment monitoring of predator numbers (frequency, number & type).
    iii. Establish sage-grouse monitoring regimes
        1. Monitor sage-grouse population trends/demographic rates to determine effectiveness of predator control practices.

Appendix F:

Template Cooperative Monitoring Agreement

COOPERATIVE MONITORING AGREEMENT

1. Introduction

The Joint Cooperative Monitoring Agreement is instituted under the authority of the Memorandum of Understanding between the U.S. Department of the Interior, Bureau of Land Management (BLM) and the Public Lands Council dated January 30, 2004.

The BLM and ______[*cooperator*] enter into this agreement with the intent to strengthen their partnership in monitoring of the ________ Allotment. Resource objectives will be a central feature of this agreement because they will become the target and guide regarding what and how to monitor, and for what reasons. Resource objectives will be measurable and attainable statements of the desired resource attributes.

The BLM and ______[*cooperator*] expect the monitoring plan to evolve over time. New data will provide input on how to better interpret and apply the monitoring results. This will enable the parties to optimize the application of cooperative techniques throughout the monitoring partnership. The parties will work together to determine how the monitoring results will be used to refine and redirect the strategies and tactics for both the monitoring and management plans.

2. Existing Management Objectives

The ________ Allotment was evaluated through a Rangeland Health Evaluation and Assessment document in _____[*year*]. Allotment-specific objectives were brought forward through the Final Multiple Use Decision (FMUD) for each key management area for upland areas, riparian zones, wildlife habitat, and wild horse and burro management. These objectives were established to be in conformance with the current Land Use Plan (LUP) and the Standards for Rangeland Health. Objectives under the LUP, Rangeland Program Summary, and Allotment Evaluation are attached. Also attached are the __________ Resource Advisory Council Standards and Guidelines (RAC S&Gs).

3. Existing Monitoring Data/Information and Additional Data Needs to Address Established Resource Objectives

a. Established Monitoring Methodologies

Short-term	**Long-term**
Actual Use Information	Trend (Frequency study)
Use Pattern Mapping	Production/Composition/Ecological Status
Key Species Utilization at long-term	Cover

upland monitoring sites	
Riparian Utilization	Weed Inventory
	Water Quality
	Climate data
	Wild Horse & Burro Census
	Riparian Proper Functioning Condition (PFC) Assessment

b. Additional Studies Needed

Short-term	Long-term
None	Upland Soil Site Stability
	Photo Trend Monitoring
	Riparian Multiple Indicator Monitoring (MIM)

4. **Future Monitoring Attributes and Protocols**

   a. Key Management Areas, Critical Area, or Designated Management Areas have been selected for the _________ Allotment utilizing BLM protocols. The site(s) will be reconfirmed jointly. If a site is not reconfirmed as an appropriate monitoring site, consideration must be given to the historical data associated with the site and a determination should be made whether or not to continue monitoring this site to retain trend information.

   b. Monitoring by the BLM and the cooperator will be consistent with BLM protocol and technical references. Short and long-term monitoring studies will allow for measurement(s) towards specific objective(s).

   c. Any updates to technical references/BLM protocol will be incorporated for use under this cooperative monitoring agreement in the future. If additional monitoring studies become available that will supplement studies already occurring for measuring an objective, this cooperative monitoring agreement will be updated.

5. **Frequency and Timing of Monitoring (cooperator/agency specific for each cooperative monitoring agreement and cooperator interest)**

   a. Short-term monitoring will be collected on an annual or semi-annual basis, unless otherwise stipulated. Long-term monitoring will be measured at 3-10 year intervals unless otherwise stipulated or if observations indicate a more rapid than expected rate of change. Observers will be consistent in the plant phenology or time of year in which data are collected. If new sites are established, data collection will follow BLM protocol, BLM technical references, and this Cooperative Agreement.

b. The following monitoring studies will be conducted as appropriate in order to measure progress towards meeting the objectives and for determining if the RAC S&Gs are being met.

Short-term monitoring (Upland triggers or indicators):

Study	**Responsible Party**	**Collection Period**
Actual Use	Cooperator	Annually
Trigger Monitoring	Cooperator	Annually
Key Area Utilization	BLM	Semi-annually
Landscape Appearance (Ranchers' Monitoring Guide)	Cooperator	Annually
Use Pattern Mapping	BLM	As grazing management changes, funding, and priorities dictate
Climate	BLM and Cooperator	Annually

Long-term monitoring (Upland objectives):

Study	**Responsible Party**	**Collection Period**
Frequency	BLM	Every 5-10 years
Photo Trend	Cooperator	Annually
Production/Composition	BLM	Every 5-10 years
Line Intercept	BLM	Every 5-10 years
Line-Point Intercept	BLM	Every 5-10 years

Short-term monitoring (Riparian triggers or indicators):

Study	**Responsible Party**	**Collection Period**
Utilization/Stubble Height	BLM	Every 3-5 years
Stream Bank Alteration	BLM	Every 3-5 years

Long-term monitoring (Riparian objectives):

Study	**Responsible Party**	**Collection Period**
PFC (assessment)	BLM	Every 5-10 years
Multiple Indicator Monitoring	BLM	Every 5-10 years

c. Each party will contact the other party prior to collecting monitoring data on the ___________ Allotment in order to further promote a cooperative and collaborative working environment.

d. If a cooperator is interested, they may request to collect additional monitoring studies from those assigned above after adequate training and verification by the BLM.

e. Parties are encouraged to conduct monitoring efforts together, where possible.

6. Data Analysis

a. The BLM and the Permittee will meet to discuss the monitoring data collected. Each party will be provided copies of the monitoring data collected each given year for the associated monitoring file.

b. The BLM and the Cooperator will meet periodically to discuss the monitoring data collected.

c. The BLM and the Cooperator will review data analysis jointly and discuss any future changes that may be needed in order to address resource concerns.

7. Agreement Implementation

a. Collection of monitoring data specified in this cooperative agreement will occur at appropriate times immediately upon signature of this agreement. Data share between the parties will occur by the end of each calendar year.

Cooperator ________________________________ Date_________________________

BLM Authorized Officer____________________ Date_________________________

Appendix G:

Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and their Habitats, excerpt page 25-29

VII. Standards to Avoid or Minimize Impacts to Sage-grouse (All Energy Developments)

It is important to note here that some recommendations differ for non-migratory and migratory populations of sage-grouse. For the purposes of this document, non-migratory populations of sage-grouse are those where the majority of individuals do not make long distance movements between or among seasonal ranges (individuals travel <10 km one way between seasonal ranges). Migratory populations are those in which a preponderance of individual grouse move ≥10 km one way between seasonal ranges (derived from Connelly et al. 2000).

A. Site Selection

1. The NGSCT considers Category 1 habitats (leks and nesting habitat) irreplaceable and Category 2 habitats (quality winter and brood rearing habitats) critical to the long term persistence of sage-grouse populations. Energy or transmission development should be avoided within Category 1 and 2 sage-grouse habitats.
2. Energy development is strongly discouraged from occurring in Category 3 habitats; however, if unavoidable, projects in these habitats should be situated to minimize impact through placement in the least suitable portion of habitat.
3. Renewable energy developers are encouraged to pursue project development activities within Category 4 and 5 habitats within the range of sage-grouse in Nevada.
4. Project proponents should focus on previously disturbed sites in high potential wind resource areas. These areas could be described as those with prior disturbances including, but not limited to, previously burned areas, dense pinyon and juniper woodlands, areas converted to agriculture and areas within existing linear rights of way (transmission corridors).
5. If habitat categories have not been identified for a certain area, energy facilities and transmission lines should not be sited within 3 miles of the nearest active lek location for non-migratory populations[3].
   a. To the greatest extent possible, energy developers should work closely with NDOW and pertinent federal agency biologists to determine important nesting, brood rearing and winter habitats and avoid those areas.
6. Where populations of sage-grouse are considered migratory, energy facilities and transmission lines should not be sited within 3 miles of the nearest active lek location and should not be sited within the associated nesting habitat for that particular population.
   a. Consideration should also be given to movement corridors between breeding, nesting, brood-rearing or winter habitat. These movement corridors may not be well defined unless significant radio marking investigations have been conducted for a particular population. It is recommended that these investigations take place where project proponents are proposing developments in likely movement corridors for sage-grouse.
7. No development should occur within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats.

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[3] Holloran (2005) found that natural gas development within 3 – 5 km (approximately 2 - 3 miles) of active sage-grouse leks led to dramatic declines in breeding populations. Walker et al. (2007) also found that coal-bed natural gas development within 0.8 km and 3.2 km had strong negative effects on sage-grouse and detected effects as far as 6.4 km. Johnson et al. (In Press) found that few leks were located within 5 km (≈3 miles) of developed land and trends in male attendance were lower for those leks with more developed land within 5 km or 18 km.

B. Pre-Development Planning and Survey Requirements (All Energy Related Developments)

Each proposed energy facility requires some level of detailed individual evaluation. Unique habitat conditions can and do exist due to local variations in wildlife populations and movement patterns, habitats, area topography, facility design, and weather (Alberta Fish and Wildlife Division 2005). The level of pre-project planning and the need for certain surveys or monitoring depends on the seasonal habitat that the project is located in and the importance of the particular habitat. It is the intent of the NGSCT to complete mapping of habitat categorizations in 2010. The following are standards recommended by the NGSCT for pre-project planning and surveys:

1. Identify the cover type of habitat and habitat category of proposed development by using R-value classifications, current seasonal habitat delineations and previous telemetry information. These habitat types and categories should be determined on a site specific basis through consultation with NDOW.
2. A remote assessment (utilizing GIS applications) of present habitat condition should be conducted. This assessment should include vegetative classification, seasonal habitat layers, aerial photos, fire polygons and other man-made structures on the landscape including transmission lines, roads or other anthropogenic features.
3. If the project happens to occur in Category 1 or 2 habitats, a comprehensive monitoring plan should be developed and approved by NDOW that addresses demographics and seasonal movement patterns. The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee provides sound recommendations in their Interim Guidelines for Evaluating the Impacts of Energy Development (Appendix A).
4. In Category 3 or 4 habitats, field investigations should be conducted by the applicant to determine the actual condition of the habitat and the approximate extent of use by sage-grouse through consultation with NDOW. The potential for habitat improvement should be identified and a restoration or habitat enhancement plan should be developed.
5. If a project is located in Category 5 habitats, surveys (radio-marking of individuals in adjacent sage-grouse populations or stratified random pellet counts) should be considered to determine if sage-grouse move through the area between seasonal habitat patches. If movement across the area is detected, then recommendations should be made to preserve movement patterns by grouse.

C. Project Development (All Energy Related Developments)

Through this guidance document, we hope to eliminate more direct impacts to sage-grouse populations through avoidance of Category 1 through 3 habitats. However, unless Greater Sage-grouse habitats are afforded increased protection from federal land management agencies such as the BLM, it is likely that some form of renewable energy development will occur within these types of habitats. The NSGCT recognizes that there are projects in the advanced stages of permitting or development which have obtained final or near-final siting approvals from federal, state and/or private entities, and that the siting and/or mitigation commitments for such projects may not be consistent with some of this document's recommendations. Where this is the case, and where the project has worked with federal and state agencies on matters relevant to wildlife prior to the release of this document, the NSGCT respects agreements that have already been made with regard to siting and mitigation measures. We hope that project proponents in these situations can use the recommended guidance contained in this document to minimize the effects of development where possible. However, if sage-grouse are listed as a threatened or endangered species by the U.S. Fish and Wildlife Service in the future, then projects on federal lands would be subject to section 7 consultation. Prior agreements may be subject to further review.

It is important to note here that some recommendations differ for non-migratory and migratory populations of sage-grouse. For the purposes of this document, non-migratory populations of sage-grouse are those where the majority of individuals do not make long distance movements between or among seasonal ranges (individuals travel <10 km one way between seasonal ranges). Migratory populations are those in which a preponderance of individual grouse move ≥10 km one way between seasonal ranges (derived from Connelly et al. 2000). If a project were approved in Category 1 through 3 habitats, the following represents guidelines suggested by the NGSCT:

1. Where sage-grouse populations are non-migratory energy facilities should not be constructed within 3 miles of the nearest active lek site (see Chapter 1, Section C).
2. Where populations of sage-grouse are considered migratory, energy facilities should not be constructed within 3 miles of the nearest active lek location and should not be sited within the associated nesting habitat for that particular population.
3. If construction within 3 miles of an active sage-grouse lek is absolutely unavoidable, conduct construction activities from 15 July to 30 November to avoid disturbing sage-grouse during the breeding, nesting, early brood rearing and winter periods.
    a. If pumping stations are placed within 3 miles of an active lek, consideration should be given, and attempts made to place these features in an area where noise would least impact the actual lek using topography to help mask noise.
4. Avoid practices that remove sagebrush cover in these habitat categories as they may be the most important areas to sage-grouse using these habitats.
5. No development or infrastructure features should be placed within 0.6 miles (1 km) of identified late brood rearing habitats, especially meadow complexes and springs. These features can provide a competitive advantage for avian predators; therefore increasing sage-grouse mortality during a period when birds may be susceptible.
6. A comprehensive monitoring plan approved by the Nevada Department of Wildlife will be required to monitor sage-grouse demographics, vital rates and movement patterns before, during and after the construction phase within Category 1 – 3 habitats. The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee provide sound recommendations in their Interim Guidelines for Evaluating the Impacts of Energy Development (Appendix D).
7. Within Category 1-3 sage-grouse habitats, a company representative should be on site to oversee compliance during construction and provide environmental training to on-site personnel. This individual is responsible for overseeing compliance with all protective measures and coordination in accordance with the permitting authority and resource agencies should have the authority to issue a “stop work order” if deemed necessary.
8. Human Activity (Daily Operations/Maintenance)
    a. Vehicle trips should be limited to those times that would least impact nesting or wintering grouse:

        i. Vehicle trips should not occur on a regular basis within 3 miles of an active lek or in identified nesting habitats from 01 March through 15 May.
            1) If vehicle trips are required during the lekking period, vehicles should only be operated from 10:00 a.m. to 5:00 p.m. daily.
        ii. Public access to construction areas should be limited if construction activities are occurring from 01 March through 15 May.

D. Associated Infrastructure (Transmission Lines, Road, Substations, Fences, etc.)

The infrastructure associated with utility scale energy developments can potentially be as detrimental as the facility itself. Roads, transmission lines, substations, fences and vehicle traffic can all eliminate or create disturbance within sage-grouse habitats. Even though a wind generation facility or geothermal power plant may not be constructed in optimal sage-grouse habitats, it is likely that roads and/or transmission lines associated with the facility will be. The following guidelines apply to associated infrastructure:

1. Transmission lines should not be sited within 3 miles of the nearest active lek location or in nesting habitat that occurs outside lek buffers.
    a. In instances where transmission line placement is within 3 miles of the nearest active lek location and cannot be avoided, apply standards 5-9 in this section.
        i. Attempt to place the line in the least suitable habitat within a 3 mile radius of the nearest active lek.
        ii. Consider placing the transmission line to the west of the nearest active lek so that avian predators are at a disadvantage (i.e., looking into the sun) in the early morning hours.
2. Roads and below ground infrastructure (i.e. buried power lines, pipelines) should not be sited within 0.6 miles (1 km) of the nearest lek site. These features are a concern because their construction directly removes potential nesting habitat and act as vectors for invasive plant species establishment (e.g., cheatgrass).
3. To the greatest extent practical, transmission lines should be placed near existing highway corridors at “minimum safe distances” designated by the BLM or project proponent to reduce direct and indirect effects to sage-grouse.
4. In all instances where structures are to be placed in sage-grouse habitat, especially nesting habitat, preliminary surveys should be conducted to identify sage-grouse nesting areas and all attempts should be made to avoid these areas.
5. Structures should be constructed with the least amount of perching or nesting substrate possible by avoiding such things as external ladders and platforms.
6. Use tubular tower designs with pointed tops rather than lattice designs.
    a. This should be applied as a standard design within the range of sage-grouse in Nevada regardless of habitat categorization.
7. In addition to tubular towers, conventional perch and nesting deterrents should be utilized in adherence to the Migratory Bird Treaty Act. Perching and nest deterrents include:
    a. devices installed on support towers;
    b. actual physical maintenance through hazing; and/or
    c. physical removal of nest structures.
8. Avoid removing sagebrush cover whenever feasible, especially in identified winter habitats.
9. Avoid use of guy wires whenever possible.

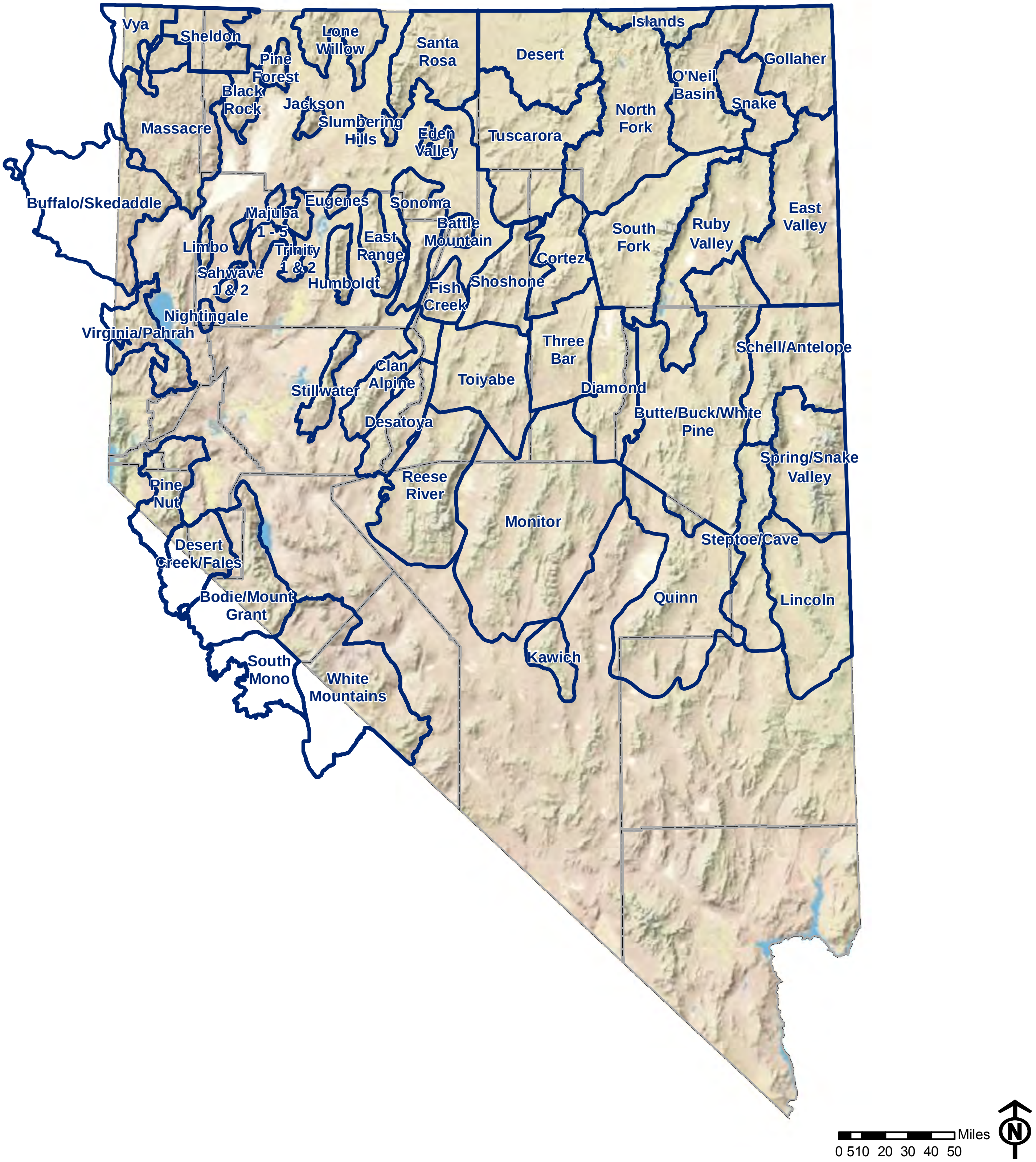
   a. In some circumstances, use of guy wires may facilitate tower design features which minimize perching and nest building (e.g. guyed V tubular tower). The overall benefit to sage-grouse of these designs is likely to compensate for any direct affect to sage-grouse from guy wire strikes; however, guy wires should be marked with devices (e.g. spiral vibration damper, FireFly™ bird flight diverter) to increase the visibility of the wires to avian species, thus minimizing strikes.

10. To reduce the impact of new fences on sage-grouse, new fence proposals (including those for emergency stabilization and rehabilitation) should be carefully evaluated for sage-grouse collision risk (BLM IM 2010-022).
    a. In the process of prioritizing areas for flagging or marking fences, state wildlife agency personnel shall be consulted (BLM IM 2010-022).

E. Post Project Development

1. Monitoring
   a. Within Category 1 through 3 sage-grouse habitats, a comprehensive monitoring plan will be required that addresses demographics, vital rates and seasonal movement patterns. The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee provide sound recommendations in their Interim Guidelines for Evaluating the Impacts of Energy Development (Appendix D).
   b. Information gained from monitoring can be used to help develop future mitigation measures.
2. Noxious Weed Prevention
   a. Roads and the footprint of wind turbine pads, geothermal energy plants, and transmission lines should be monitored at least annually for any noxious weeds and, if found, treated with appropriate techniques.
3. Noise Reduction
   a. Noise levels from geothermal facilities, oil and gas pumping stations or gas pipeline compressor stations should not exceed 55 decibels (dBa) at leks. Several noise muffling techniques and equipment are available.
      i. Noise mufflers should be installed at gas compressor stations;
      ii. Noise barriers should be installed around oil and gas pumping stations;
      iii. Temporary noise shields should be constructed around portions of the drilling rigs and used on standard construction equipment.
4. Decommissioning
   a. Any roads that were built, primarily for construction only, should be decommissioned post construction to deter dispersed vehicle use within sagebrush habitats and the creation of new roads.
      i. Decommissioned roadways should be restored, to the greatest extent practicable, to the pre-existing vegetative condition.
   b. Developers should restore pathways of buried transmission lines or pathways to a desired vegetative condition.

FIGURES



Greater Sage-Grouse
Population Management Units

September 19, 2014

Projection: UTM Zone 11 North, NAD83

No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data.

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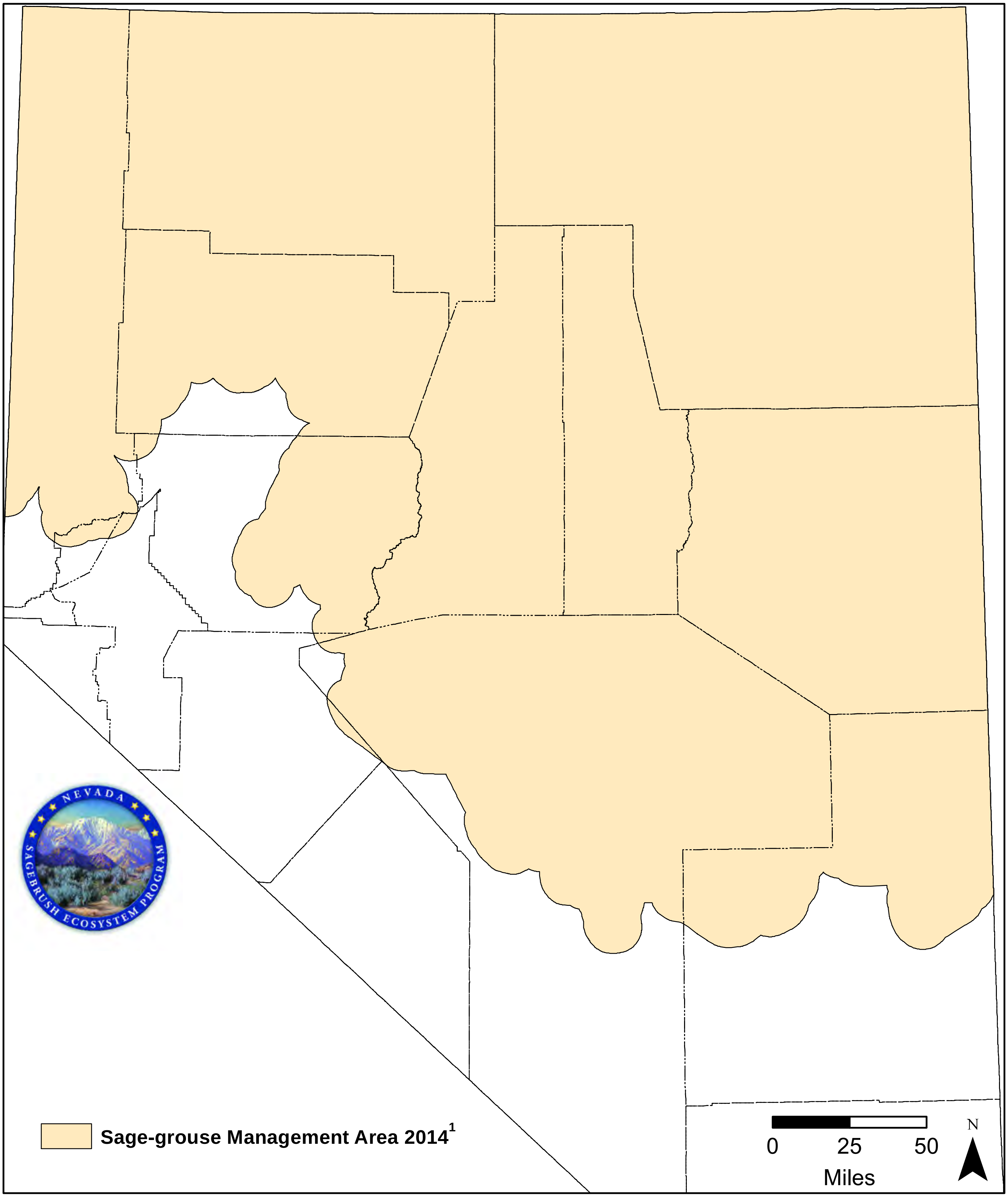

Figure 2. Sage-grouse Management Area (SGMA)

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1. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

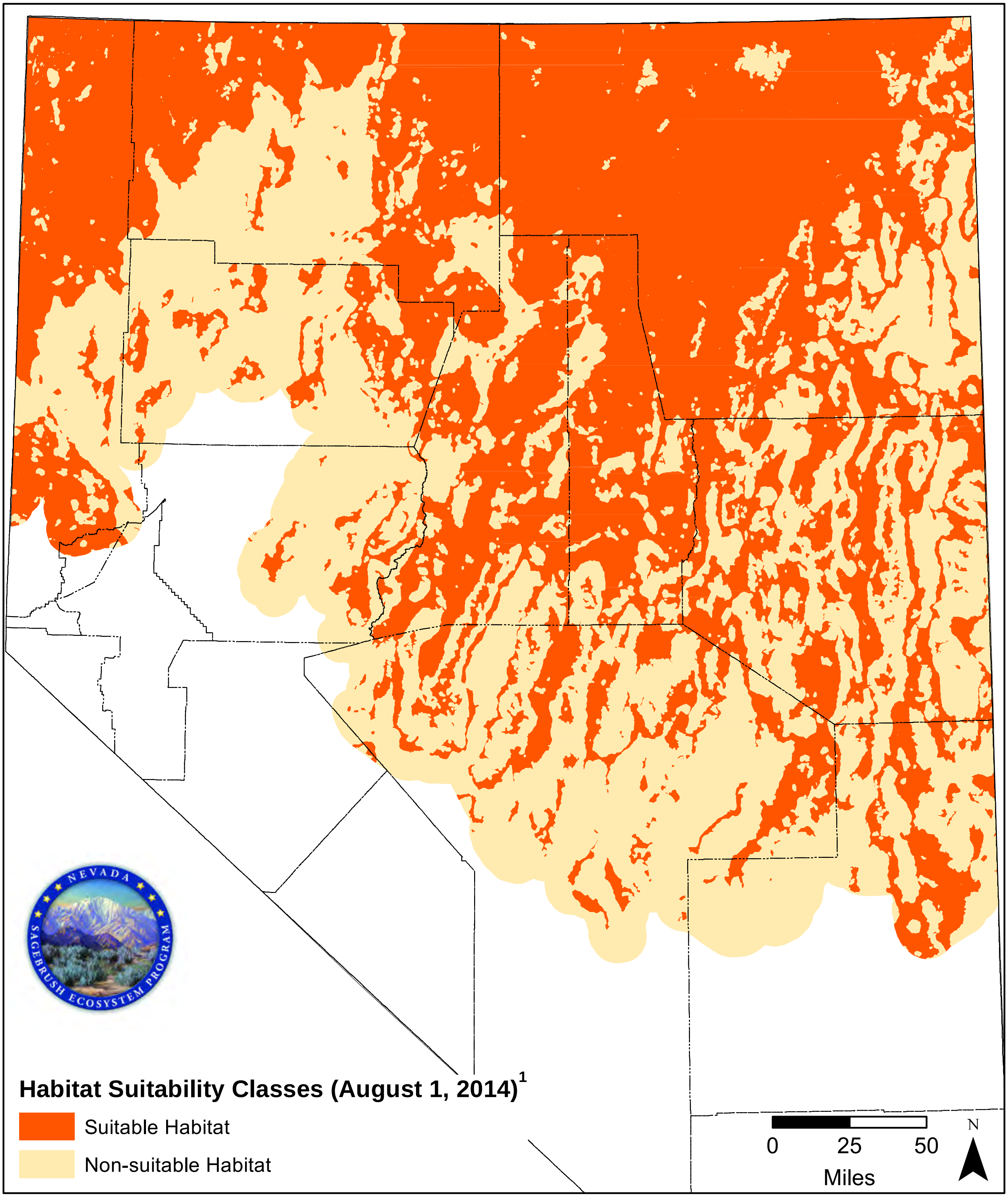

Figure 3. Habitat Suitability Classes

[1] Coates et al. 2014

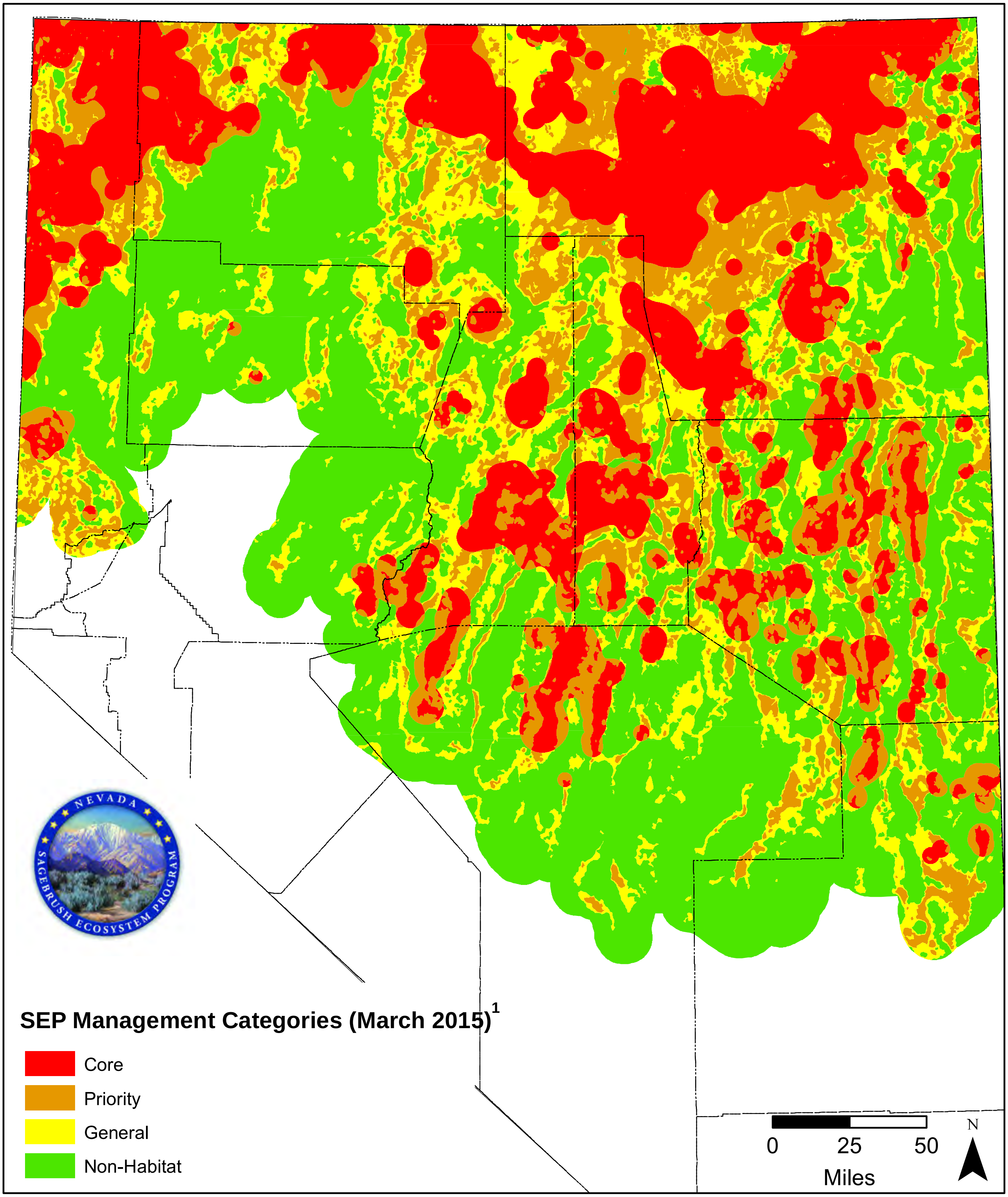

Figure 4. Management Category Map

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1. Coates et al. 2014

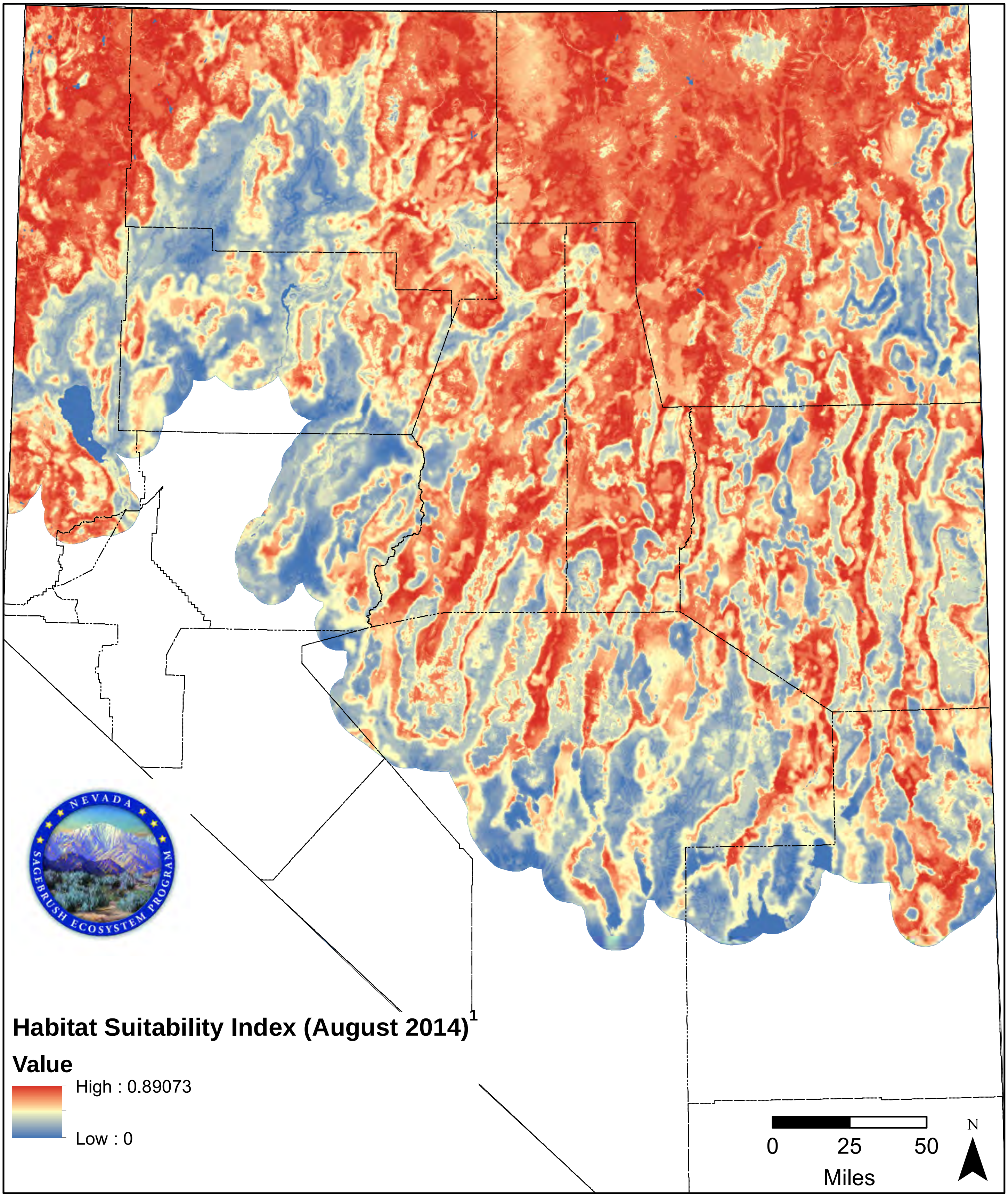

Figure 5. Habitat Suitability Index

1. Coates et al. 2014

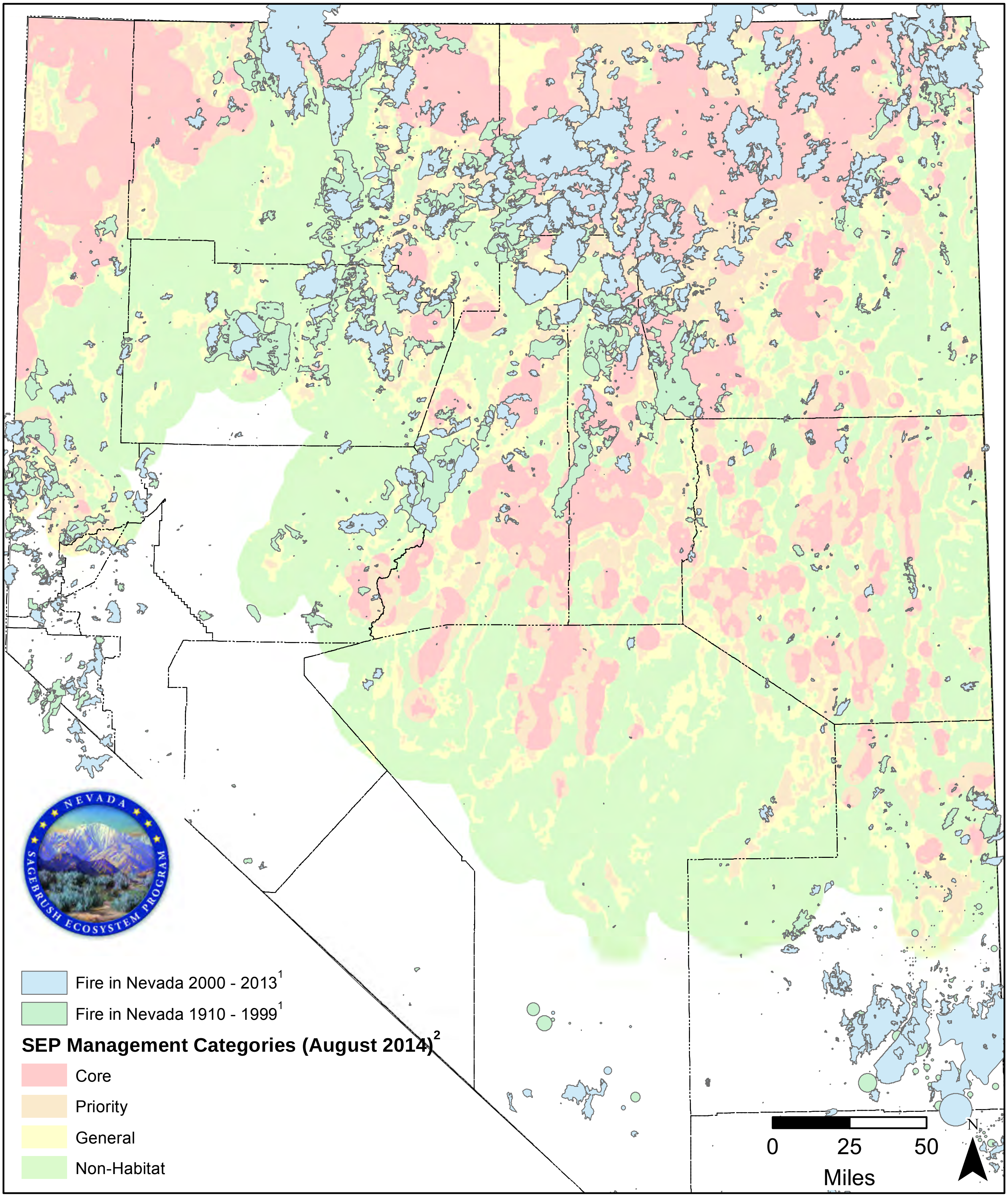

Figure 6. NV Fire History (1910 - 2013)

1. http://www.blm.gov/nv/st/en/prog/more_programs/geographic_sciences/gis/geospatial_data.html Accessed August, 2014
2. Coates et al. 2014

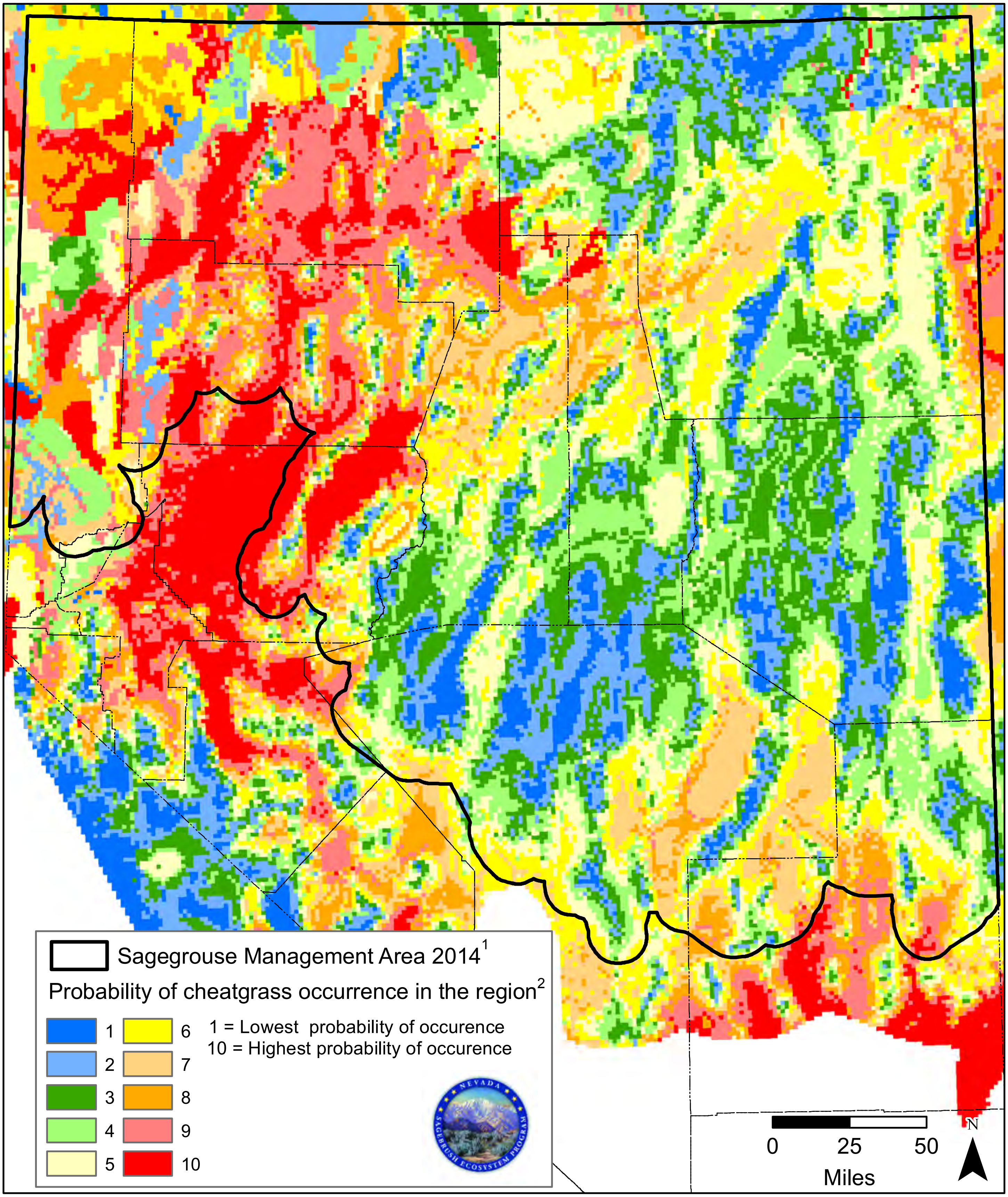

Figure 7. Probability of Cheatgrass Occurance

1. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

2. http://sagemap.wr.usgs.gov/ftp/sab/cheat_dec.zip Accessed September 2014

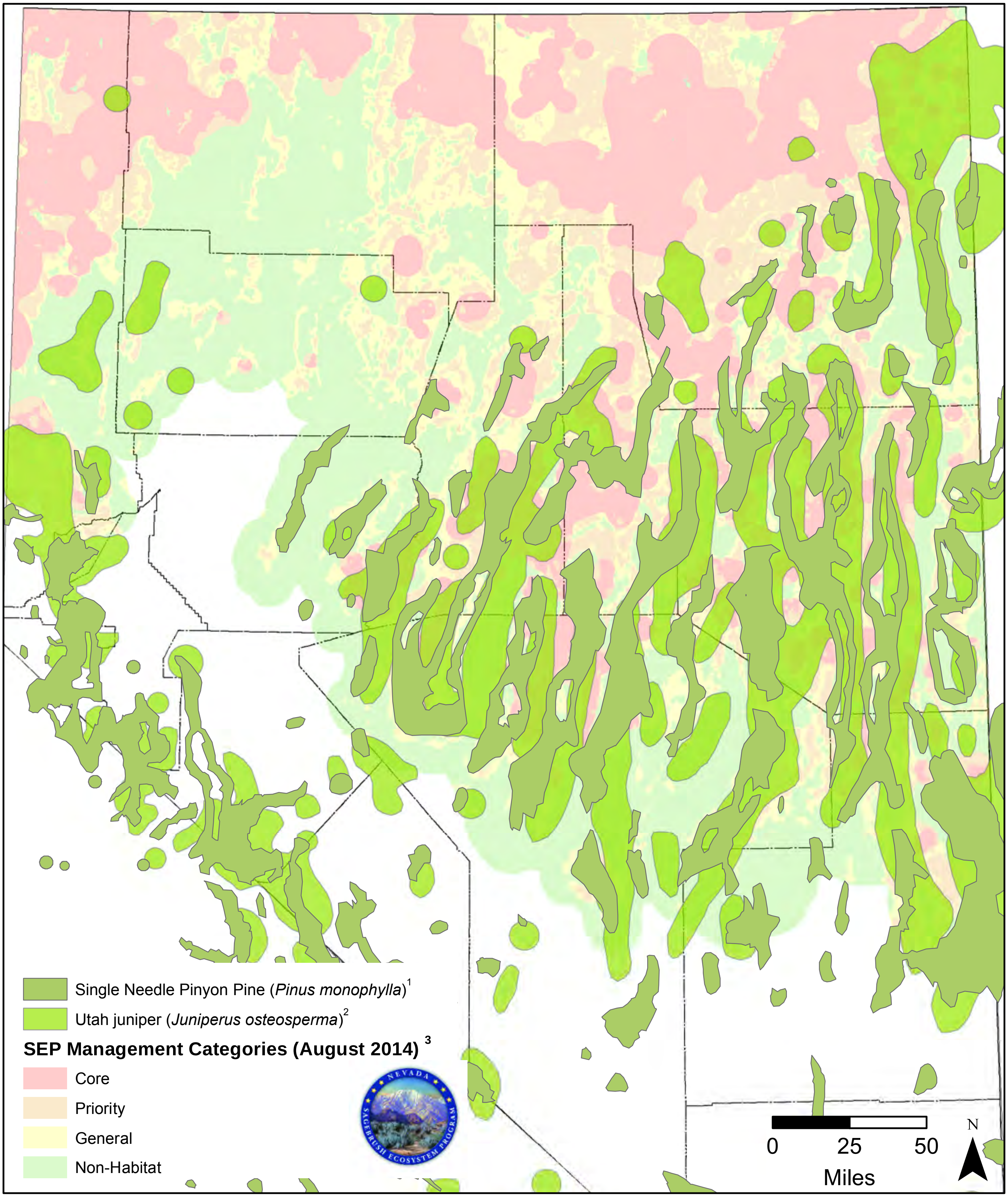

Figure 8. Single Leaf Pinyon Pine and Utah Juniper Ranges in NV

1. Data Basin: http://app.databasin.org/app/pages/datasetPage.jsp?id=ba674e845007441685a725d8fa962eb3
2. Atlas of the United States Trees by Elbert L. Little Jr.
3. Coates et al. 2014

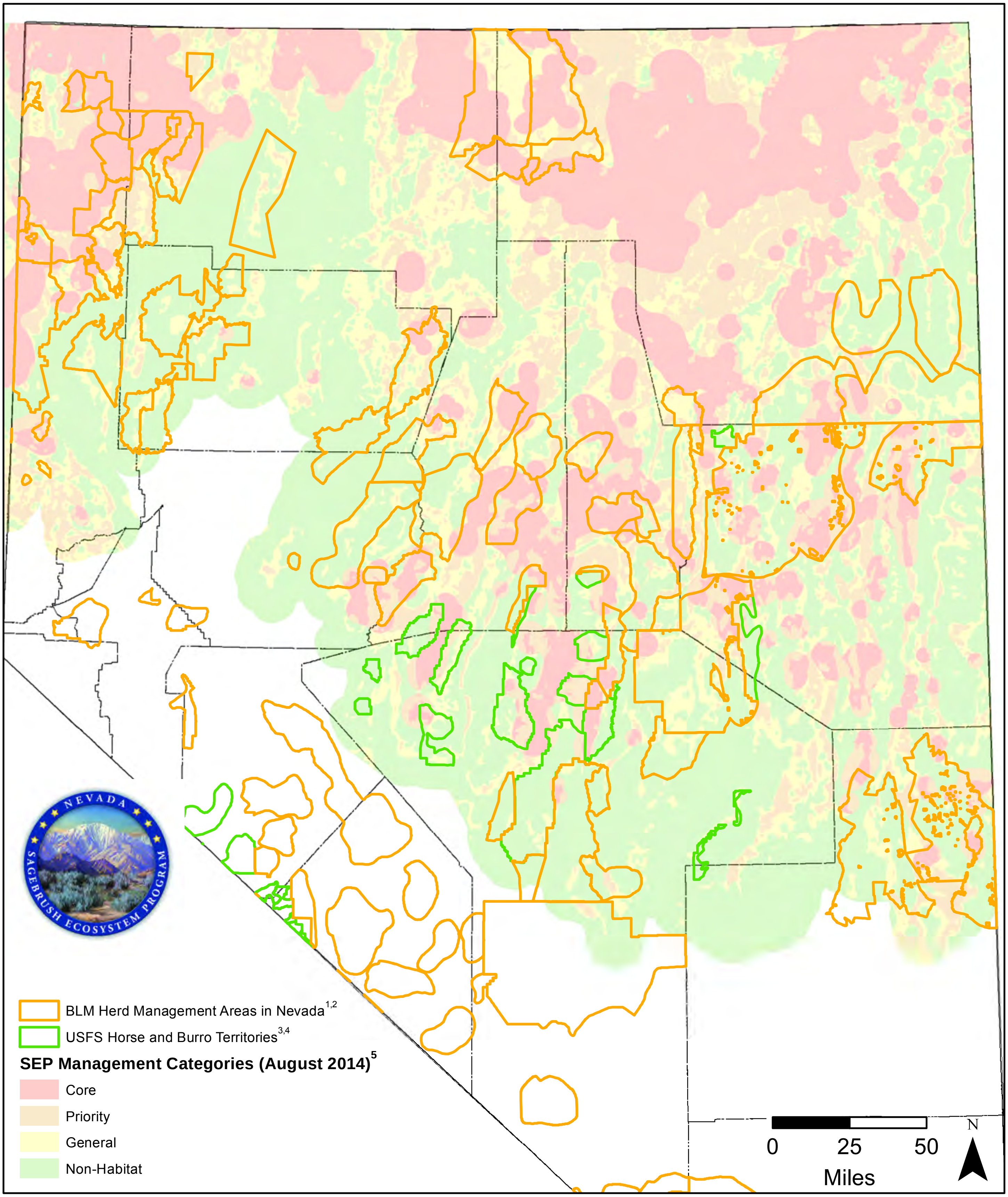

Figure 9. HMAs and WHBTs in Nevada

1. http://www.blm.gov/ca/gis/index.html Accessed August 13, 2014
2. http://www.blm.gov/nv/st/en/prog/more_programs/geographic_sciences/gis/geospatial_data.html Accessed August 13, 2014
3. http://www.fs.usda.gov/detail/r5/landmanagement/gis/?cid=STELPRDB5327833 Accessed August 13, 2014
4. http://www.fs.usda.gov/main/htnf/landmanagement/gis Accessed February 18, 2014
5. Coates et al. 2014

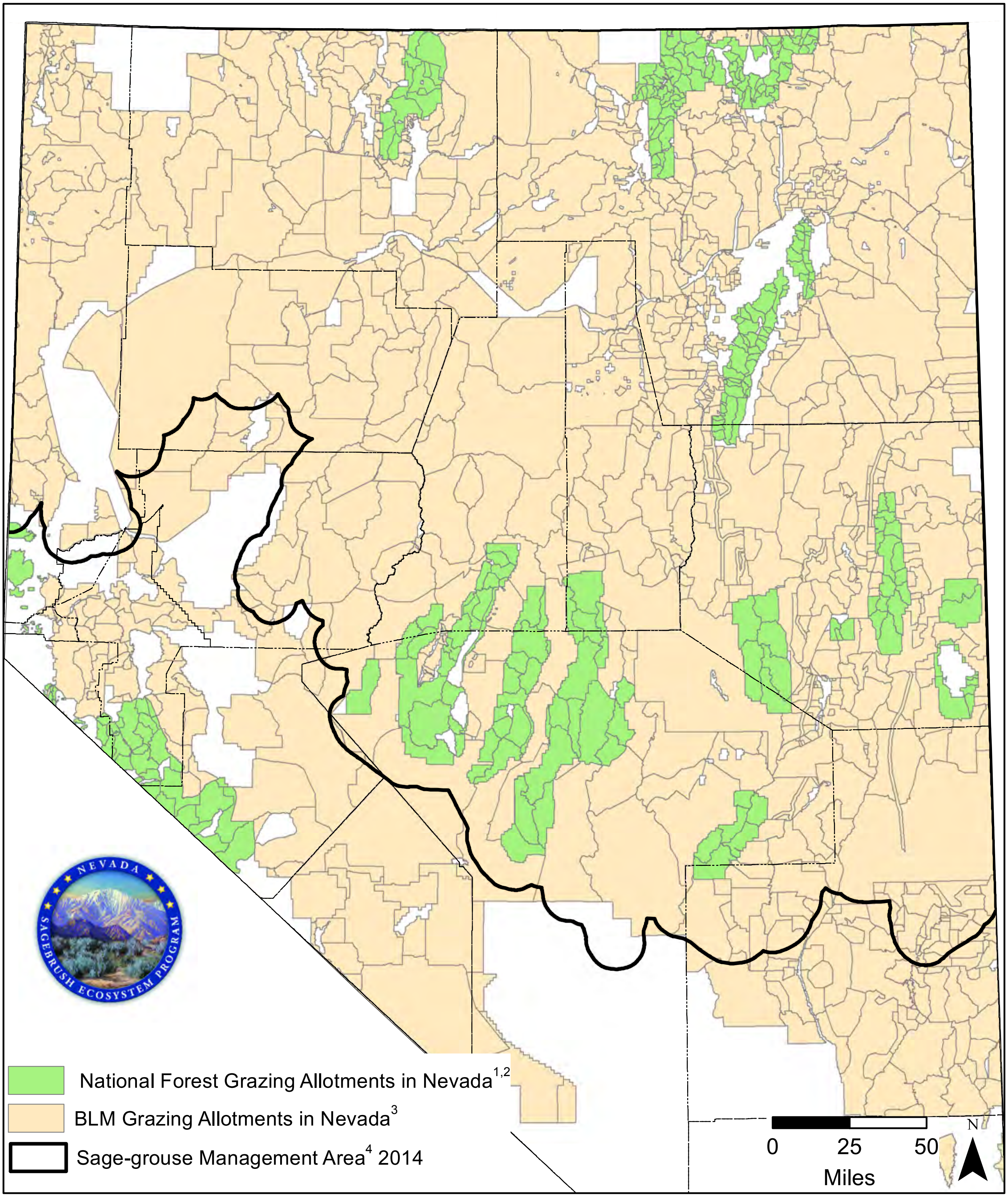

Figure 10. BLM and FS Grazing Allotments in Nevada

1. http://www.fs.usda.gov/main/htnf/landmanagement/gis Accessed August 12, 2014
2. http://www.fs.usda.gov/detail/r5/landmanagement/gis/?cid=STELPRDB5327833 Accessed August 13, 2014
3. http://www.geocommunicator.gov/shapefilesall/GA/BLM_Grazing_allotments.zip Accessed August 12, 2014
4. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

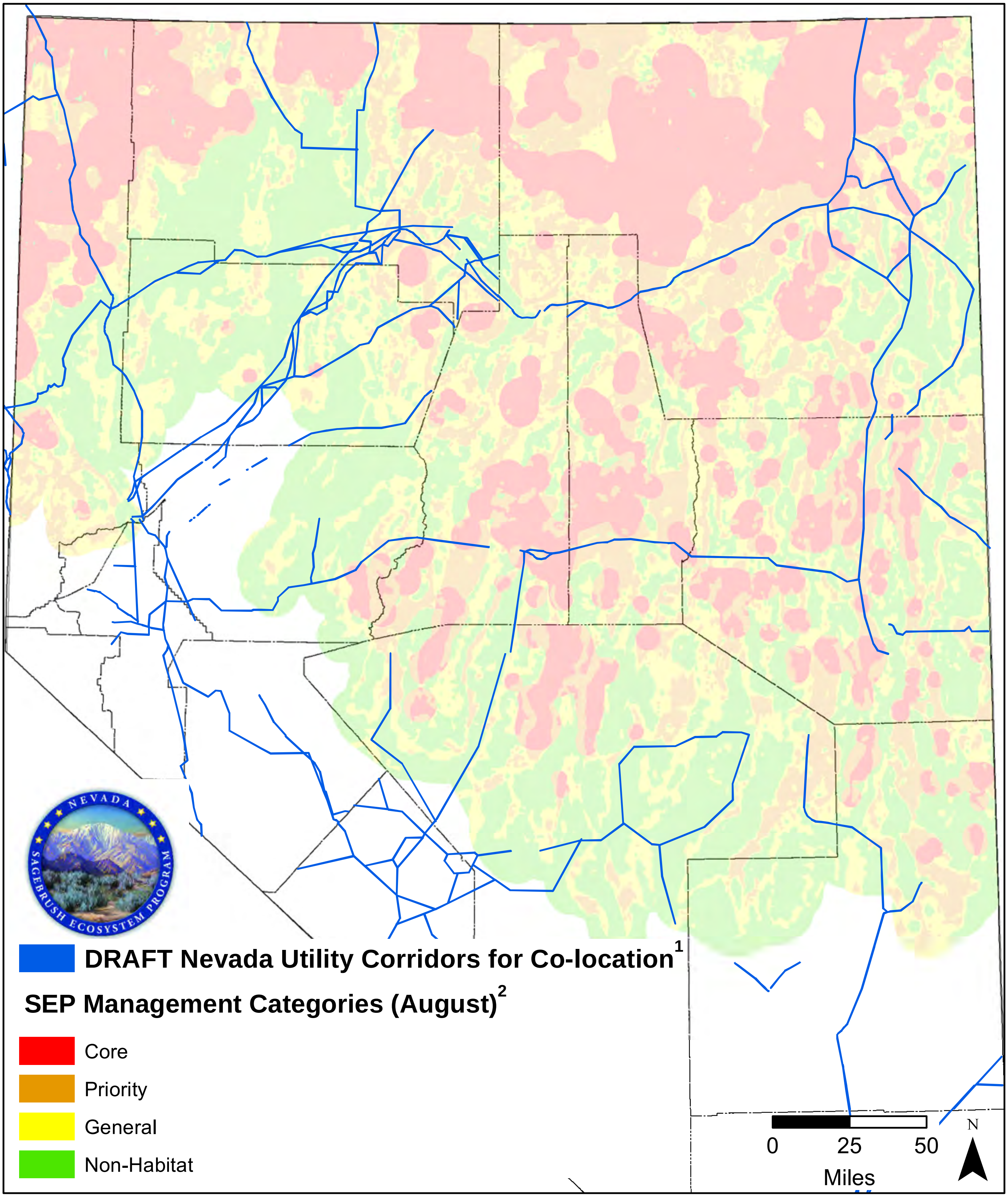

Figure 11. Utility Corridors for Co-location in Nevada

1. Utility Corridor Co-location is still draft. Contact BLM Nevada State Office: Leisa Wesch lwesch@blm.gov
2. Coates et al. 2014

Sagebrush Ecosystem Council

State of Nevada

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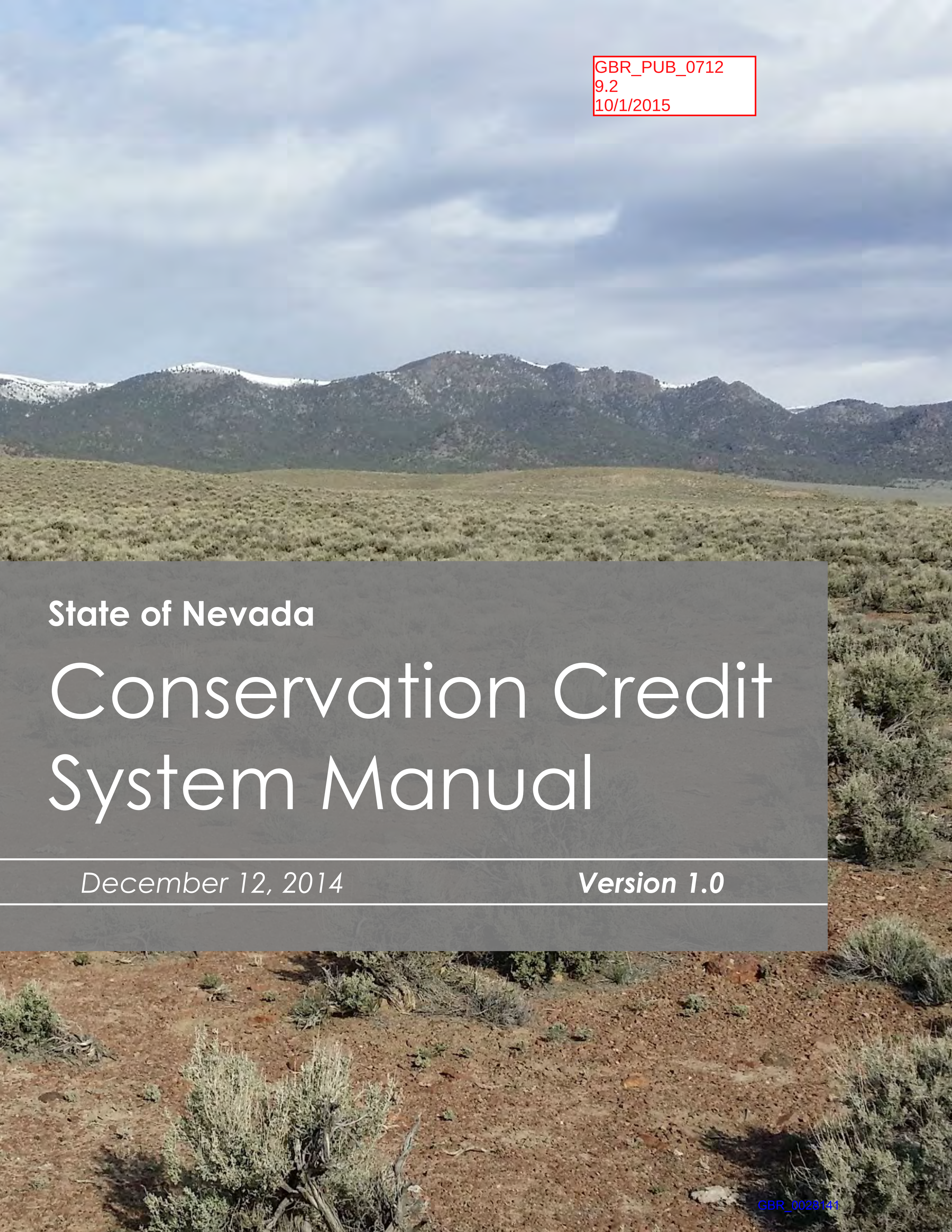

State of Nevada

Conservation Credit System Manual

December 12, 2014

Version 1.0

The Nevada Conservation Credit System is administered by Sagebrush Ecosystem Technical Team of the Division of State Lands' Sagebrush Ecosystem Program within the State Department of Conservation and Natural Resources.

For information and questions about the Nevada Conservation Credit System, please contact:

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The consulting team was led by Environmental Incentives, LLC and included Ecometrix Solutions Group and Environmental Defense Fund.

The Nevada Conservation Credit System incorporates design, organization, and content from documents developed by Environmental Incentives, LLC, Willamette Partnership, and Environmental Defense Fund, among others. In particular, the Nevada Conservation Credit System operations were adapted from the Colorado Habitat Exchange Manual Version 0.95. Thus, in accordance with the Open Content License from that document: This content was created in part through the adaptation of procedures and publications developed by Environmental Incentives, LLC (www.enviroincentives.com), Environmental Defense Fund (www.edf.org), and the Willamette Partnership (www.willamettepartnership.org), but is not the responsibility or property of any one of these entities.

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The Credit System has been developed with an eye toward transparency and easy extension to address multiple environmental issues across geographic regions. As such, permission to use, copy, modify and distribute this publication and its referenced documents for any purpose and without fee is hereby granted, provided that the following acknowledgement notice appears in all copies or modified versions: "This content was created in part through the adaptation of procedures and publications developed by Environmental Incentives, LLC, Environmental Defense Fund, and Willamette Partnership, but is not the responsibility or property of any one of these entities."

IMPLEMENTATION TIMELINE

As of October 2014, the Nevada Conservation Credit System (Credit System) is open for *credit project* enrollment and development. The Credit System *Administrator* – the Nevada Sagebrush Ecosystem Technical Team - is working with landowners to validate potential credit sites to determine if they are eligible to produce credits and estimating the expected credits generated by the proposed projects using the Habitat Quantification Tool (HQT) and site-specific *Management Plans*. The Nevada Sagebrush Ecosystem Program (SEP) encourages landowners and other parties interested in developing credits to contact the Nevada Sagebrush Ecosystem Technical Team (SETT) to get started. All application fees are waived through the end of 2014.

In January 2015, the Credit System will begin evaluating *debit projects* for *credit obligations* and start the process of awarding credits to *offset* debit projects. The Credit System's policies and technical requirements will be updated systematically through a formal, annual adaptive *management process*. Significant updates are anticipated during the years of implementation, as the Nevada Sagebrush Ecosystem Program gains transactional experience. Any changes will only apply to new credit and debit projects, thus credits awarded and credit obligations fulfilled through the Credit System will not be impacted by future updates to the Credit System.

The Credit System can be used to meet regulatory requirements established by State of Nevada statute NRS Chapter 232.162, and are intended to fulfill *compensatory mitigation* requirements currently under development for anthropogenic disturbances to greater sage-grouse habitat on Bureau of Land Management (BLM) and U.S. Forest Service (USFS) lands in the State of Nevada. However, the Credit System does not currently provide *participants* with federal regulatory assurances in the event that greater sage-grouse is listed as threatened or endangered under the Endangered Species Act (ESA). In the future, the Credit System intends to provide regulatory assurances by developing a programmatic *agreement* with the U.S. Fish and Wildlife Service (USFWS).

INTRODUCTION TO THIS MANUAL

The Nevada Conservation Credit System Manual (Credit System Manual) provides the necessary materials and information for understanding and participating in the Nevada Conservation Credit System (Credit System). The table below provides a summary of the contents of the Credit System Manual. The Credit System Administrator will use this document to guide *Credit System operations* and policies over time. Landowners and other parties interested in generating credits, and any parties interested in purchasing credits through the Credit System should refer specifically to guidance provided in *Section 2: Technical and Policy Considerations*, regarding specific technical and policy considerations that arise during the generation and *transfer* of credits to *Credit Buyers* and the determination of credit obligations for debit projects.

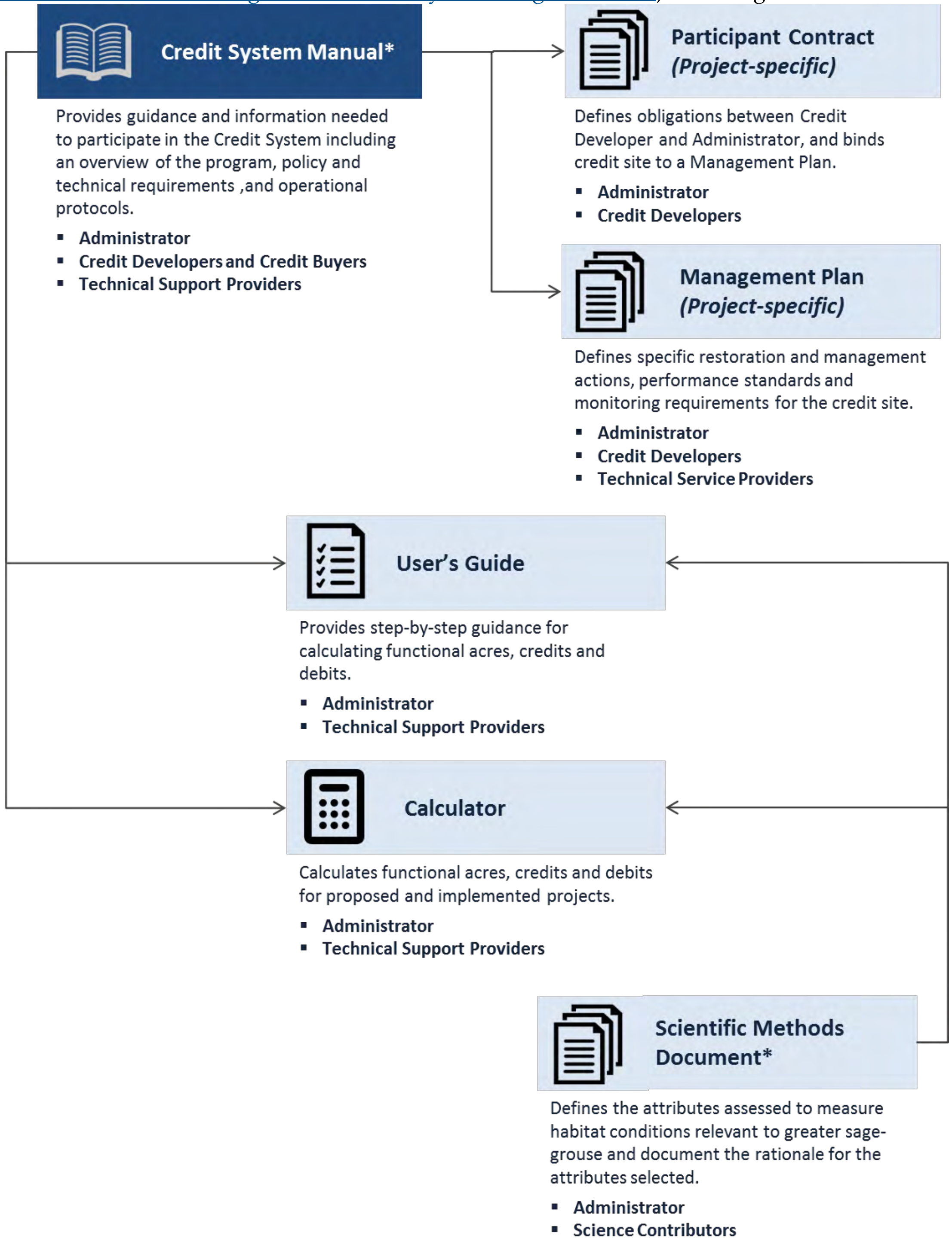
CREDIT SYSTEM MANUAL CONTENTS

Section 1: Credit System Overview	Provides an overview of the objectives, scope and primary participants of the Credit System.
Section 2: Policy & Technical Elements	Summarizes the primary policy and technical requirements necessary to develop credits and offset credit obligations, and govern the Credit System.
Section 3: Credit System Operations	Defines the detailed steps, tools and timing to: ▪ Quantify and verify credits generated and credit obligations from individual project sites, including fulfilling ongoing *verification* requirements. ▪ Obtain credits and use them to mitigate debit projects (credit obligations), or define and report the effectiveness of *management actions* not used to offset impacts. ▪ Systematically evaluate new information, report results and improve the accuracy and efficiency of the Credit System over time.
Appendix A: Glossary	Defines key terms used throughout the Credit System Manual.
Appendix B: Forms and Instructions	Lists forms to be filled out by Credit System participants and submitted to the Credit System Administrator. Contact the Sagebrush Ecosystem Technical Team for form and guidance documents.

The first use of a term defined in the glossary in *Appendix A* is in italic font.

CREDIT SYSTEM TOOLS & DOCUMENTS

Several tools and documents are used to describe and operationalize the Credit System. The primary tools and documents are summarized in **Error! Reference source not found.** and the most recent versions are available on the Credit System website (https://www.enviroaccounting.com/NVCreditSystem/Program/Home) or through the Administrator.



Credit System Manual*

Provides guidance and information needed to participate in the Credit System including an overview of the program, policy and technical requirements ,and operational protocols.

- **Administrator**
- **Credit Developers and Credit Buyers**
- **Technical Support Providers**

Participant Contract *(Project-specific)*

Defines obligations between Credit Developer and Administrator, and binds credit site to a Management Plan.

- **Administrator**
- **Credit Developers**

Management Plan *(Project-specific)*

Defines specific restoration and management actions, performance standards and monitoring requirements for the credit site.

- **Administrator**
- **Credit Developers**
- **Technical Service Providers**

User's Guide

Provides step-by-step guidance for calculating functional acres, credits and debits.

- **Administrator**
- **Technical Support Providers**

Calculator

Calculates functional acres, credits and debits for proposed and implemented projects.

- **Administrator**
- **Technical Support Providers**

Scientific Methods Document*

Defines the attributes assessed to measure habitat conditions relevant to greater sage-grouse and document the rationale for the attributes selected.

- **Administrator**
- **Science Contributors**

Figure 1: Primary Credit System tools and documents (documents with an * define the scope and form of the Credit System and changes to these documents will be approved by the Oversight Committee as described in *Step A1.1 in Section 3*)

LIST OF ACRONYMS

ACEC	Area of Critical of Environmental Concern
AIM	BLM's Assessment, Inventory, and Monitoring data
BLM	Bureau of Land Management
CCA	Candidate Conservation Agreement
CCAA	Candidate Conservation Agreement with Assurances
ESA	Endangered Species Act
FOIA	Freedom of Information Act
HCP	Habitat Conservation Plan
HSI	Habitat Suitability Index
HQT	Habitat Quantification Tool
MOU	Memorandum of Understanding
MZ	Management Zone
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
PMU	Population Management Unit
ROW	Right-of-Way
SEC	Sagebrush Ecosystem Council
SEP	Sagebrush Ecosystem Program
SETT	Sagebrush Ecosystem Technical Team
SHA	Safe Harbor Agreement
SGMA	Sage-grouse Management Area
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WAFWA	Western Association of Fish and Wildlife Agencies

CONTENTS

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SECTION 1: CREDIT SYSTEM OVERVIEW

Greater sage-grouse (*Centrocercus urophasianus*) populations have declined significantly from historic numbers[1], in Nevada and throughout their current range (which includes 11 US states and 2 Canadian provinces). The decline of greater sage-grouse populations is largely attributable to the degradation, fragmentation and loss of habitat caused by wildfire, particularly in the western portion of the species range, and by the increased prevalence of invasive species and conifer encroachment. Additionally, anthropogenic disturbances resulting from infrastructure, mineral and energy development, improper grazing practices and other human activity contribute to habitat loss for the species[2].

In 2010, the U.S. Fish and Wildlife Service (USFWS) announced the finding that listing the greater sage-grouse as threatened or endangered under the Endangered Species Act is warranted, but precluded by higher priority listing actions[3]. By September 2015, the USFWS must propose whether or not to list the greater sage-grouse as threatened or endangered. This listing could significantly impact Nevada's economy and way of life. One component of Nevada's proactive conservation strategy is the development of the Nevada Conservation Credit System (Credit System).

The SEP was established in 2013 and its purpose is to protect and enhance Nevada's sagebrush ecosystems, culture and economy by promoting good stewardship, as stated in the Sagebrush Ecosystem Council mission statement. The Credit System provides a mechanism to achieve sage-grouse conservation goals while preserving the integrity of the culture and economy of the State of Nevada.

The Credit System is an innovative solution to greater sage-grouse habitat protection that ensures habitat impacts from anthropogenic disturbances are fully compensated by long-term enhancement and protection of habitat that result a net benefit for the species, while allowing appropriate anthropogenic disturbances that are vital to the Nevada economy and the Nevada way of life. The Credit System creates new incentives 1) to avoid and minimize impacts from anthropogenic disturbances to important species habitat, and 2) for private landowners and public land managers to preserve, enhance, and restore habitat, while reducing threats to important habitat for the species. The Credit System is a performance-driven and market-based approach to species conservation that quantifies benefits from enhancement and protection of habitat (*credits*) and negative impacts to habitat from anthropogenic disturbances (*debits*), operationalizes market transactions, and reports net benefit from all transactions processed by the Credit System.

1.1 CREDIT SYSTEM GOALS & PRINCIPLES

The goal of the Credit System is for impacts from anthropogenic disturbances to be offset by enhancement and protection that results in a net benefit for greater sage-grouse habitat in the State of Nevada. In the future, the Credit System may be expanded to support the *stewardship* and *restoration* of Nevada's sagebrush ecosystem overall and other sagebrush obligate species, in addition to the greater sage-grouse.

---

[1] Garton, E.O., J.W. Connelly, J.S. Horne, C.A. Hagen, A. Moser, and M. Schroeder.2011.Greater sage-grouse population dynamics and probability of persistence.

[2] U.S. Fish and Wildlife Service. 2013. Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013.

[3] "Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered," 50 Federal Register 17. Volume 75, No. 55 (23 March 2010), pp. 13910-13911.

GUIDING PRINCIPLES

The Credit System enables the stewardship and restoration of a resilient and resistant sagebrush ecosystem. The Credit System works within the regulatory *mitigation* hierarchy, where anthropogenic disturbance impacts are first avoided, then minimized, and then the residual unavoidable impacts are mitigated using the Credit System. The following principles guide the development and operation of the Credit System and are meant to provide clarity and guidance in cases where the Credit System Manual is silent or unclear.

- Produce high quality conservation where it makes a significant ecological and biological difference.
- Enable decision-making based on the best available science.
- Create an efficient marketplace, where each transaction is anticipated to result in a net benefit for greater sage-grouse.
- Foster transparency, accountability, and credibility.
- Improve the effectiveness and efficiency of the Credit System over time.

1.2 GEOGRAPHIC & PARTICIPANT SCOPE

The geographic scope of the Credit System is consistent with the current Sage-Grouse Management Area (SGMA), the 2014 SGMA map is provided in Figure 2 as an example. The range of the Bi-State Distinct Population Segment of the greater sage-grouse in the State of Nevada is not included in this Credit System.

Proposed anthropogenic disturbances to habitat on State of Nevada, BLM, USFS, and local government lands within the SGMA require consultation with the SETT and the appropriate federal agency, as defined in the 2014 Nevada Greater Sage-Grouse Conservation Plan[4]. This consultative process will determine when residual unavoidable impacts require compensatory mitigation through the Credit System. Private landowners are not required to mitigate anthropogenic disturbances on their land; however, they are encouraged to voluntarily participate in the Credit System by generating or purchasing credits. The Credit System scope can be expanded in the future to support additional conservation needs and to correspond with revisions to habitat and management maps.

Figure 2: Sagebrush Ecosystem Program Sage-grouse Management Area Map, 2014

1.3 ORGANIZATIONAL STRUCTURE & ROLES

The organizational structure and interactions between the participants in the Credit System are depicted in Figure 3 below, followed by a description of each participant. Additional detail regarding the governance structure and roles is provided in *Section 2.1.1: Program Governance.*

Nevada Division of State Lands (NDSL): NDSL is a division of the Nevada Department of Conservation and Natural Resources, and holds the ultimate responsibility to ensure the Credit System functions as designed.

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[4] http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/home/features/2014_ConsolidatedStatePlan.pdf

Oversight Committee: The Sagebrush Ecosystem Council (SEC) is a legislatively established council comprised of representatives from conservation interests, industry, ranching, and government which is responsible for overseeing the operations of the Credit System and making policy decisions.

Administrator: The SETT is responsible for managing the day-to-day operations of the Credit System, including facilitating and overseeing all credit generation and transaction activities. The SETT ensures consistent operations, issues credits, and reports results.

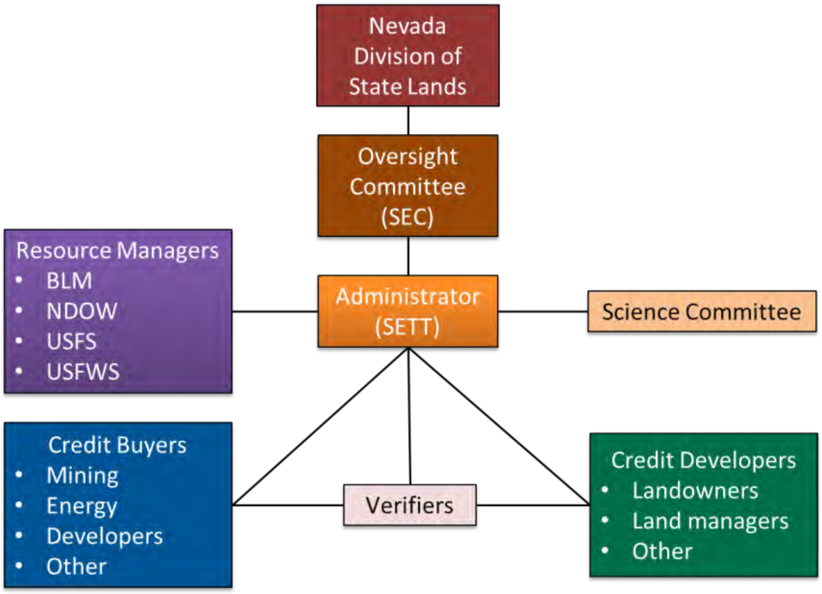

Figure 3: Operational structure of the Nevada Conservation Credit System

Resource Managers: Agencies that manage greater sage-grouse populations or habitat areas within the scope of the Credit System, and ensure that the Credit System functions according to current law, policy, and regulations.

Science Committee: Species and ecology scientists and experts who inform science-related policy decisions and development of technical products and tools, like the HQT. The Science Committee makes recommendations to the Administrator, based on the best-available science regarding the greater sage-grouse and its habitat.

Verifiers: State, local and federal agency staff or private contractors who assess the accuracy of credit and debit calculations. Verifiers must be trained and certified by the Administrator and must meet qualifications established by the Oversight Committee.

Credit Developers: Landowners or managers, organizations, or agencies, that produce, register, or sell credits in the Credit System. *Credit Developers* may also be facilitators, such as conservation banking companies or other types of *Aggregators*, who work with multiple landowners to implement credit projects, develop Management Plans, secure *financial assurances*, and register and sell credits.

Credit Buyers: Entities that purchase credits to meet credit obligations or to meet other conservation objectives.

Technical Support Providers ***(Not included in Figure*** **3*)***: Individuals and entities with technical expertise in conservation planning and project design, who understand how to use the Credit System tools and forms. Technical Support Providers may be hired by Credit Developers or Credit Buyers to help design credit projects and estimate credit obligations, use the HQT to estimate credits and debits, and submit all required materials to the Administrator. There is no formal process to designate or certify a Technical Support Providers.

1.4 HABITAT QUANTIFICATION & CREDIT SYSTEM CURRENCY

Credits are the currency of the Credit System. A credit consists of verified habitat value that is made durable for the defined duration of the project through financial assurances and contract requirements to maintain habitat performance standards as defined in a site-specific Management Plan. Credits are primarily awarded for meeting performances standards, not for implementing conservation practices.

Credits are used to offset debits, which represent units of greater sage-grouse habitat value lost by anthropogenic disturbances. The credit obligation is the quantity of credits required to offset a debit project.

The Credit System measures habitat value in units of *functional acres*. Function refers to the role of the habitat in providing life history requirements for greater sage-grouse, and includes the direct and indirect effects of anthropogenic disturbances. Function is expressed as a percent function in relation to fully-functioning habitat for greater sage-grouse. Functional acres are the product of percent function and acres within the relevant area assessed as illustrated in Figure 4.

The Credit System uses the HQT to quantify functional acres for both credit and debit sites. A summary of the HQT and credit and debit calculation is provided below, and the concepts below are described in detail in the *HQT Scientific Methods Document*, and the following sections of this Manual: *Section 2.3.4: Calculating Credit Baseline Habitat Function*, *Section 2.5.4: Calculating Debit Baseline Habitat* and *Section 2.2: Habitat Quantification and Credit and Debit Calculation*.

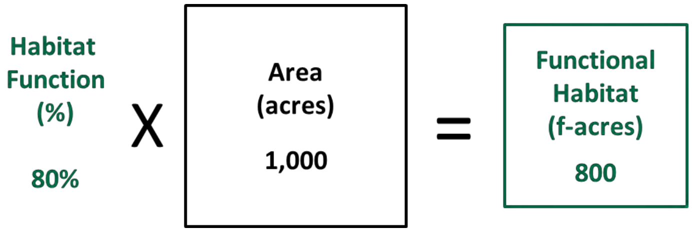

Figure 4: Illustration of functional acre concept

Habitat Quantification Tool

The HQT quantifies *habitat function* for greater sage-grouse habitat in the State of Nevada. The HQT generates a percent function and a number of functional acres for each seasonal habitat type (breeding, late brood-rearing, and winter) within the area assessed.

The HQT accounts for habitat characteristics or attributes that influence sage-grouse habitat selection across multiple scales. These habitat characteristics were based on different orders of selection (Johnson 1980, Stiver et al. 2010) that represent four spatial scales at which habitat attributes influence where greater sage-grouse reside and obtain resources necessary for survival and reproduction[5]. The HQT assessed habitat quality at four orders.

Key Terms

Credit: A quantifiable unit of a greater sage-grouse habitat conservation value measured as the difference between credit baseline functional acres and post-project functional acres multiplied by a mitigation ratio, and secured by contract requirements, a project-specific Management Plan and financial assurances.

Credit Obligation: Quantify of credits that must be acquired to offset debits generated by a debit project.

Debit: A quantifiable unit of loss to greater sage-grouse habitat value from an impact measured as the difference between debit baseline functional acres and post-project functional acres multiplied by a mitigation ratio.

Habitat Function: The ability for habitat to provide life history requirements for greater sage-grouse considering needs across multiple spatial scales. Function is expressed as a percentage in relation to fully functioning habitat for greater sage-grouse.

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[5] While the term 'selection' may be interpreted as relating to individual bird behavior, in this context the term is applied broadly to describe the four geographic scales at which sage-grouse occur, are organized into populations and use habitat (per Johnson 1980, Connelly et al 2003, Stiver et al 2010). These four scales also correspond to scales at which sage-grouse policy and management are

Range-wide Scale (1st order): The range considered by the Credit System is the geographic range of the sage-grouse population in Nevada.

Landscape Scale (2nd order): Landscape selection is based on the availability of seasonal habitats needed to support a population or subpopulation.

Local Scale (3rd order): Local selection is based on suitability of the habitat within their home range and the effects of anthropogenic disturbances.

Site Scale (4th order): Site selection is based on vegetation structure and composition that provide forage and cover.

See the *HQT Scientific Methods Document* for additional information on the attributes measured at each scale (order), and the methods used to measure those attributes.

Credits, Debits and Credits Obligations

Credits and debits represent the difference between baseline functional acres and post-project functional acres, multiplied by a mitigation ratio that incorporates biologically significant factors that are not captured through the HQT. Figure 5 illustrates how baseline is subtracted from the post-project habitat value to determine the functional acres above baseline for a credit project. Figure 6 illustrates how the functional acres above baseline are multiplied by a mitigation ratio to determine the number of credits generated by the credit site. Debits are calculated in a similar way; however the post-project functional acres are subtracted from the baseline functional acres to determine the loss in habitat value.

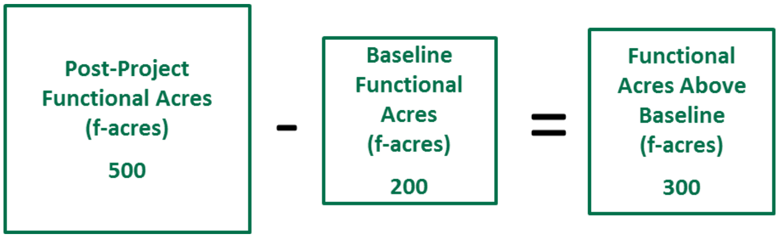

Figure 5: Illustration of functional acres above baseline for a credit project

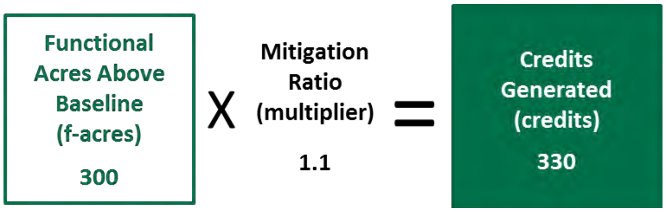

Figure 6: Illustration of the credits generated from a credit project

The HQT generates functional acre values for each seasonal habitat type (breeding, late brood-rearing and winter), and unique mitigation ratios are also generated for each habitat type. The change in habitat value for each seasonal habitat is tracked and reported by the Credit System; however only the most valuable habitat type is used to determine the credits or debits generated from the site. Guidance for determining the mitigation ratio for each seasonal habitat type is provided in *Section 2.2.2: Mitigation and Proximity Ratios*, and the calculation to determine the seasonal habitat type of greatest value is illustrated in *Section 2.2.3: Credits and Debit Calculation*.

The amount of credits required to offset a debit project, the credit obligation, is the number of debits generated by the project adjusted by a proximity ratio, determined by the proximity between the debit site and the offsetting credit site. Guidance for determining the proximity ratio and the credit obligation for a debit project is provided in *Section 2.2.2: Mitigation and Proximity Ratios*.

1.5 CREDIT SYSTEM OPERATIONS OVERVIEW

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typically implemented (Stiver et al. 2010). Throughout this document, orders of selection will be identified by their descriptive terms (e.g., site scale, local scale, landscape scale).

This section provides an overview of the steps used to generate and transfer credits between accounts for credit and debit projects, and for the Administrator to manage the program. These processes are defined in detail in [*Section 3: Credit System Operations*]() of this Credit System Manual. Specific tools, forms, and guidance that are tailored to the Credit System are included in [*Appendix B*]().

Figure 7: Overview of the process steps to generate and purchase credits

The steps for generating and transacting credits are depicted in Figure 7, above. Blue chevrons signify the steps undertaken to generate credits, green chevrons represent the steps to buy credits to offset credit obligation or for conservation purposes, and the orange Track and Transfer connector represents the steps and platform within which transactions occur.

GENERATING CREDITS

The following steps outline the process to generate, verify and register credits from a credit project under the Credit System.

1. **Select & Validate Site:** Credit Developers may select any project site on private or public land that provides verified benefit to greater sage-grouse habitat, as determined by the Credit System's *credit site eligibility* requirements. The Credit Developer completes a Validation Checklist to determine whether eligibility requirements are met and submits to the Administrator for approval or rejection and commentary. This stage provides a screen to minimize investment and cost to participants for sites that may not be eligible to generate credits.
2. **Implement & Calculate Credit:** Credit Developers design the project, quantify the expected number of credits using the HQT, implement conservation practices, and refine calculations based on *conditions* on-the-ground.
3. **Verify Conditions:** All projects undergo third-party verification to confirm that protocols were followed correctly and projected credits are appropriately calculated, according to actual on-the-ground conditions.
4. **Register & Issue:** Once a project has been verified, supporting documentation is submitted to the Administrator where it is reviewed for completeness before credits are registered and issued to the Credit Developer's account on the Credit System Registry. Upon issuance, credits are given a unique serial number so they can be tracked over time.
5. **Track & Transfer:** Issued credits are tracked by the Administrator using the Credit System Registry and are either transferred to a Credit Buyer's account or held in other accounts. After transfer, the Credit Developer is responsible for meeting the *monitoring*, reporting and verification requirements of each project for the life of the project (described in [*Step D3 in Section 3*]()). Credit Developers annually confirm that *performance standards* are met and additional *credit releases* are triggered, where applicable.

ACQUIRING CREDITS

The following steps outline the process to purchase credits under the Credit System.

1. **Indicate Initial Interest:** Credit Buyers become aware of the opportunity or requirement to participate in the Credit System and contact the Administrator to provide basic information. Additional assistance and technical support is available, if desired.
2. **Determine Credit Need:** Credit Buyers determine the duration and amount of credit needed to best meet their needs. If fulfilling a regulatory offset, Credit Buyers determine credit amount needed by estimating and verifying debit baseline and post-project conditions of the debit site in accordance with the relevant regulatory instrument and the HQT, and the geographic location of credit offsets.
3. **Acquire Credits:** Credit Buyers contact the Administrator and confirm needed credit quantities. The price, terms and conditions are all set by the Credit Buyer and Credit Developer, or Administrator. The Administrator provides notice when credits have been transferred between accounts.
4. **Track & Transfer:** Credits are tracked using unique serial numbers that identify the source of each credit, the HQT version used to estimate credits, and the current owner. Once credits are transferred to a Credit Buyer's account, the Credit Buyer can use that information for internal and external reporting.

MANAGING THE CREDIT SYSTEM

The Credit System is managed by an Administrator, using a transparent and inclusive management process to improve the efficiency and effectiveness of the Credit System over time. The Oversight Committee acts as a board of directors for the Credit System, and is responsible for adopting any changes made to the Credit System through a defined management process. This process follows the steps depicted in Figure 8.

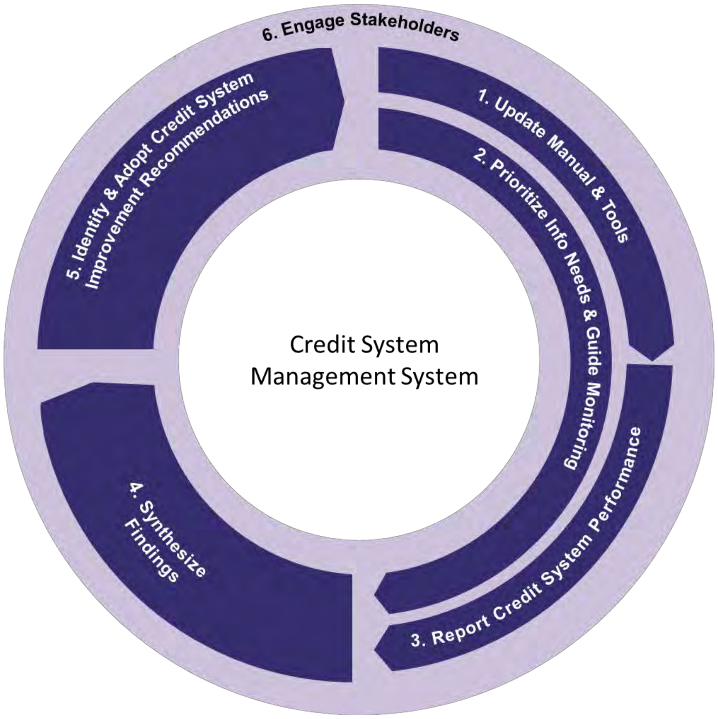

Figure 8: Overview of Credit System Management

1. **Update Manual & Tools:** Administrator updates this Credit System Manual, as well as tools, forms, and related guidance to ensure practical experience and new scientific information result in increased efficiency and effectiveness.
2. **Prioritize Information Needs & Guide Monitoring:** In coordination with the Science Committee and federal land management agencies, the Administrator identifies and prioritizes research and monitoring needs, coordinates funding efforts, and oversees monitoring and research.
3. **Report Credit System Performance:** Administrator develops the Annual Performance Report to summarize credit awards, debits and habitat improvements achieved. Routine reporting of accomplishments is essential to ensure transparency and drive accountability.

4. **Synthesize Findings:** Administrator synthesizes relevant research, monitoring and operational findings to inform Credit System improvements. Synthesizing findings into information that is directly related to the operations of the Credit System is essential to inform management decisions. Incorporating the best available science and other new information into the program and HQT ensures the calculation of credits and debits is accurate, improves project selection and design decisions, and improves accountability.
5. **Identify & Adopt Credit System Improvement Recommendations:** Administrator develops operational and technical improvement recommendations which are reviewed and acted upon by the Oversight Committee to ensure the Credit System continues to motivate effective actions over time. Creating and transparently adopting clear recommendations to improve the Credit System is the most critical step in the annual Credit System management process. The transparency of this adjustment process enables Credit Developers, Credit Buyers and other stakeholders to participate in the process and gain knowledge of the reasoning for adjustments as adopted.
6. **Engage Stakeholders:** Throughout the year, the Administrator engages stakeholders to keep them informed of progress and solicit input for how to improve the Credit System. Consistent stakeholder engagement is necessary to ensure the Credit System operates efficiently, increases understanding, and facilitates accountability.

All of the steps described in Section 1.4 above are defined in detail in *Section 3: Credit System Operations*. *Section 2: Policy and Technical Elements* defines the primary policy and technical requirements that enable consistent application of the Credit System by all participants.

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SECTION 2: POLICY & TECHNICAL ELEMENTS

This section of the Credit System Manual defines specific policy and technical requirements and additional considerations for generating credits for sale, determining debits and credit obligations, and managing the Nevada Conservation Credit System (Credit System). Table 1 below provides a summary of these requirements and considerations, including the primary audience and brief description.

Table 1: Summary of Policy & Technical Considerations

Credit System Elements		Primary Audience	Element Description & Guidance
2.1 Program Governance			
2.1.1	Governance Roles	**Administrator**	▪ The Administrator facilitates day-to-day operations, participant engagement, and program reporting and improvement
2.1.2	Implementation of State Policy		▪ State of Nevada policy that established the Credit System, and requires mitigation for anthropogenic disturbances which impact greater sage-grouse habitat to be determined by the Credit System
2.1.3	Federal Regulatory Predictability		▪ Credit System is designed to accommodate different regulatory mechanisms and provide certainty to Credit Buyers and Credit Developers
2.1.4	Accounting System & Reporting		▪ Rigorous accounting system tracks functional acres, credits and debits ▪ Annual Performance Report includes Credit System performance and program improvements
2.1.5	Adaptive Management		▪ Formal, structured programmatic adaptive management approach that deals with uncertainty and leverages management experience and research results
2.1.6	Participant Confidentiality		▪ As a State-run program, certain information must be disclosed upon request by a member of the public; however, published information protects *participant confidentiality* by aggregating information and removing identification information
2.1.7	Reserve Account Management and Use of Financial Assurances		▪ *Reserve account* serves as an insurance mechanism for the overall Credit System by allowing the Administrator to temporarily cover invalidated credits until they are *remediated* or replaced ▪ Financial assurances are used to remediate unintentional *reversals*, or to replace credits lost due to unintentional and intentional reversals that cannot be remediated
2.2 Habitat Quantification and Credit and Debit Calculation			
2.2.1	Habitat Quantification Tool	**Credit Developers & Credit Buyers**	▪ Percent function and an amount of functional acres for each seasonal habitat type are generated for each *map unit* within a project boundary, including the area indirectly impacted by debit projects ▪ Field sampling must be collected during specific times of the year for breeding and late brood-rearing habitat
2.2.2	Mitigation & Proximity Ratios		▪ Credit and debit ratios determined by management importance and limiting seasonal habitat ▪ Debits are adjusted by a proximity ratio, determined by the proximity between the debit site and offsetting credit site
2.2.3	Credit and Debit Calculation		▪ Total credits and debits generated by a project represent the difference between baseline and post project functional acres multiplied by a mitigation ratio

2.3 Credit Additionality Provisions

2.3.1	Credit Service Area	**Credit Developers**	▪ All sites must be located within the current SGMA
2.3.2	Credit Project Types		▪ Habitat stewardship ▪ Habitat restoration
2.3.3	Credit Site Eligibility		▪ Site must be located in the *Service Area* ▪ *Participant Contract* with Administrator is required and must attest to ownership or use rights and past stewardship ▪ *Additionality* must be demonstrated and post-project habitat functionality must meet minimum habitat function requirements ▪ No evidence of an imminent threat of direct or indirect disturbance ▪ Necessary financial assurances must be complete ▪ Credit Developer must attest to the accuracy of the information
2.3.4	Calculating Credit Baseline Habitat Function		▪ Local-scale, pre-project habitat function combined with a site-scale, regional standard habitat function for each seasonal habitat type
2.3.5	Developing Credits on Public Lands and Other Land Designations		▪ Additional benefit is required above and beyond what would have been achieved by planned and funded public *conservation actions*, and existing land designations
2.3.6	Partnering with Federal Programs on Private Lands		▪ Additional benefit is required ▫ **During Federal Contract:** Allocation of credits proportionate to non-federal contribution ▫ **Following Federal Contract:** Full credit for long-term extensions or agreements following expiration of federal contract
2.3.7	Stacking Credit Types		▪ Credits from other conservation programs can be generated on a Conservation Credit System credit site if the credit site can demonstrate additional benefits based on specific conservation and management practices
2.3.8	Integration with CCA/CCAAs		▪ Credits can be generated in combination with enrollment in CCA/CCAAs if they demonstrate additionality of specific conservation and management practices

2.4 Credit Durability Provisions

2.4.1	Credit Site Protection	**Credit Developers**	▪ Participant Contract with Administrator and accompanying Management Plan is required for all credit projects ▪ Additional site protection measures such as easements reduce reserve account contribution and thus increase generated credits available for sale
2.4.2	Credit Project Duration		▪ Minimum 10 year with 5 year term increments afterwards, up to in perpetuity
2.4.3	Reserve Account Contrition		▪ Contribution amount determined by base contribution, probability of adverse impacts from wildfire, and probability of *competing land uses*
2.4.4	Credit Release		▪ **Stewardship Projects:** One or more habitat function performance standards triggers credit releases ▪ **Restoration Projects:** Combination of one performance standard defined by management actions and multiple habitat performance standards triggers credit releases

2.4.5	Credit Site Verification		▪ Before initial credit release, before increased credit releases if applicable, every 5th year, and periodic spot checks ▪ Site-specific verification variability tolerance is defined as a percentage below site-scale habitat function
2.4.6	Financial Assurances		▪ Financial instrument contains sufficient funds for management of credit project ▪ Financial penalty or instrument provides appropriate funds to disincentivize intentional reversals and replace invalidated credits
2.5 Credit Obligation Provisions and Credit Investment Strategies			
2.5.1	Debit Service Area	**Credit Buyers**	▪ All sites must be located within the current SGMA
2.5.2	Debit Project Types		▪ Anthropogenic disturbances to greater sage-grouse habitat on state and federal lands within the current SGMA
2.5.3	Mitigation Hierarchy and Permit Requirements		▪ Credits are used to offset debits that occur when disturbances are proven unavoidable and minimization does not provide for complete *direct or indirect impact* avoidance ▪ Debit projects must fulfill regulatory requirements of relevant public agency permitting process
2.5.4	Debit Project Duration		▪ Time until verification confirms that habitat function impacted by a debit project returns to pre-project habitat function and an additional set period of time to allow greater sage-grouse to begin to use the site, up to in perpetuity, and can be different for different portions of a debit project
2.5.5	Calculating Debit Baseline Habitat Function		▪ Local-scale, pre-project habitat function combined with site-scale, pre-project habitat function
2.5.6	Debit Site Verification		▪ Before construction, at time when debits are reduced or end, and periodic spot checks
2.5.7	Credit Investment Strategies		▪ Strategies include direct credit purchase, reverse auctions, requests for proposals, and selection from list of credit development opportunities

2.1 PROGRAM GOVERNANCE

This section describes the Credit System's governance, enforcement, accounting and adaptive management procedures pursuant to NRS 321.594, as well as other relevant state and federal policies and assurances. The Administrator is the primary audience of this section.

2.1.1 GOVERNANCE ROLES

The Credit System uses a governance structure that includes an Oversight Committee, Administrator and Science Committee to ensure that the program is managed consistently and policy and technical requirements are improved over time without causing uncertainty for regulators or participants. Information regarding the key duties and responsibilities for each of these entities are provided below.

Oversight Committee

The SEC serves as the Credit System Oversight Committee. State of Nevada statute NRS 232.162 established the SEC; it also directed the SEC to institute and oversee a program to mitigate damage to sagebrush ecosystems. Statute NRS 232.162 also defines the membership, duties, and other aspects of the SEC, including the oversight of any team within the Division of State Lands of the Department of Natural Resources and Conservation, which provides technical services concerning sagebrush ecosystems. The SEC contains nine voting members representing specific constituencies that are appointed by the Governor, and six ex-officio members representing specific State and Federal agencies.

The SEC is responsible for overseeing the operations of the Credit System, making high-level Credit System management decisions, and conducting other critical ongoing duties described in Table 2.

Table 2: Key Responsibilities of the Oversight Committee

	Oversight Committee Key Responsibilities
Ensure Program Performance	▪ Pursues the memorandum of understanding (MOU) with BLM and potentially programmatic agreements with USFWS and other participating agencies; and participates in negotiations with USFWS and other participating agencies to amend the agreements as necessary. ▪ Oversees Administrator's implementation of the Credit System policy and technical components. ▪ Evaluates annual reports from the Administrator that include assessment of the effectiveness of credit projects in relation to both species habitat and overall programmatic performance goals of the Credit System and provide reports to USFWS, BLM and other participating agencies as necessary. ▪ Executes annual audit, or contract for the auditing of, the Administrator's finances and operations, and determine if corrective actions are needed to ensure finances and operations are sufficiently in order for the ongoing, consistent operations of the Credit System.
Ensure Programmatic Adaptive Management	▪ Considers and adopts Credit System improvement recommendations provided by the Administrator and participants. Specifically approves any changes to the Credit System Manual and HQT. ▪ Gains input from the Administrator and Science Committee on new scientific information to be incorporated into the Credit System's tools and processes as necessary and at least annually. ▪ Evaluates and approves adaptive management actions.
Participant Oversight	▪ Resolves disputes among Credit System participants that cannot be resolved independently or in consultation with the Administrator.

Administrator

The SETT serves as the Administrator of the Credit System. As Administrator, the SETT implements the Credit System, making day-to-day management decisions based on the direction detailed in this Credit System Manual and authority granted in the BLM MOU and programmatic agreements with USFWS and other agencies.

Table 3 outlines the key responsibilities of the SETT, and is aligned with the processes described in *Section 3: Credit System Operations*. The SETT will develop and maintain a comprehensive work plan to guide the allocation of resources, and define procedures to consistently and efficiently facilitate transactions.

Table 3: Key Responsibilities of the Administrator

	Administrator Key Responsibilities
Program Administration & Credit Accounting	▪ Manages day-to-day Credit System operations. ▪ Manages all Credit System tools, guidance and forms. ▪ Manages credit accounts and the complete ledger of all credits and debits. ▪ Manages accounting of reserve account credits.
Credit Developer & Credit Buyer Engagement	▪ Responds to inquiries of interest from Credit Buyers and Credit Developers, connecting them to relevant resources as desired. ▪ Ensures any necessary outreach to Credit Developers and Credit Buyers occurs.
Adaptive Management & Reporting	▪ Implements Credit System adaptive management process. ▪ Compiles Improvement Recommendations throughout the year, develops the annual Synthesis of Findings, and develops the Annual Performance Report. ▪ Brings products developed through the adaptive management process to the Oversight Committee for consideration. ▪ Makes improvements to the Calculator, User's Guide, Forms and Guidance Documents consistent with direction defined in the Manual and HQT. Informs Oversight Committee on operational changes so that the Oversight Committee can elect to review and provide alternative direction.
Compliance & Enforcement	▪ Performs quality control review on information submitted by Verifiers and Credit System participants. ▪ Ensures programmatic compliance of the Credit System with relevant USFWS, BLM, Nevada Department of Wildlife (NDOW) and other relevant agency policies. ▪ Works with Credit Developers to implement corrective actions through *remedial action plans* when appropriate in cases of intentional and unintentional reversals. ▪ Enforces contract compliance and any associated penalties in cases of intentional reversals.
Financial & Contracting Support	▪ Manages funds, contracts, and partnerships for monitoring. ▪ Confirms financial assurances are in place for credit projects. ▪ May facilitate credit auctions or Request for Proposals for Credit Buyers. ▪ May administer contract payments between Credit Buyers and Credit Developers.
Science & Technical Support	▪ Creates and gains input from the Science Committee on new scientific information to be incorporated into the Credit System's tools and processes. ▪ Defines questions to guide monitoring and research investments, and Science Committee input. ▪ Trains and certifies Verifiers. ▪ Evaluates results of any effectiveness monitoring established for credit and debit projects.

Science Committee

The Science Committee consists of species and ecology scientists and experts whose purpose is to inform the development and revision of HQTs for species and habitat included in the scope of the Credit System. The Sciences Committee contributes to prioritizing and defining monitoring efforts to improve HQTs and the Credit System, and informing the conservation and species recovery objectives that influence and guide Credit System design.

The Science Committee is composed of a minimum of four and a maximum of seven biologists, rangeland ecologists or other qualified scientists with recognized knowledge and expertise on the species and habitat. One position on the Science Committee will be held by the NDOW upland game staff specialist responsible for greater sage-grouse. The SETT appoints members of the Science Committee and members commit to serve two-year terms. Specific duties of the Science Committee include:

- Compile and analyze the latest and best-available science regarding the species and habitat, and make recommendations to the SETT regarding how that new information may be used to update the HQT through the Credit System adaptive management process; and
- Assist the SETT with making changes to the HQT through the Credit System adaptive management process.

As of November 2014, the Science Committee has not been created. A Technical Review Group made up of six greater sage-grouse scientists and experts advised the development of the initial version of the HQT. Several members of the Technical Review Group shared interest in participating in the Science Committee. The Science Committee will be created in early 2015.

2.1.2 IMPLEMENTATION OF STATE OF NEVADA POLICY

In 2012, under Governor Brian Sandoval, the 2012 Strategic Plan for Conservation of Greater Sage-Grouse in Nevada was developed and recommended the creation of Sagebrush Ecosystem Program, including the SEC and the SETT. The SEC was originally established under Executive Order 2012-19, on November 19, 2012, and later codified under State of Nevada statute NRS Chapter 232.162, which also directed the SEC to establish a crediting program for compensatory mitigation of sagebrush ecosystems[6].

The Credit System was developed to fulfill NRS Chapter 232.162 requirements and is included in the updated 2014 Nevada Greater Sage-Grouse Conservation Plan, which states mitigation requirements for anthropogenic disturbances that impact habitat will be determined by the Credit System, as approved by the SEC on October 1, 2014.

2.1.3 FEDERAL REGULATORY PREDICTABILITY

The Credit System is designed to accommodate different regulatory mechanisms to ensure that efforts taken to facilitate conservation of the greater sage-grouse are recognized and certainty is provided to Credit Buyers and Credit Developers.

BLM Compensatory Mitigation

The Credit System is expected to be included in the BLM/USFS Land Use Plans for the Northeastern California-Nevada Sub Region as the tool for defining and fulfilling compensatory mitigation requirements for anthropogenic disturbances to greater sage-grouse habitat on BLM and USFS lands in the State of Nevada. The proposal in the Nevada Alternative of the Draft Environmental Impact Statement for the Northeast California/Nevada Sub Region states that disturbances within the SGMA [on Nevada BLM and USFS lands] will trigger evaluations and consultation with the SETT. Credits are expected to be purchased to meet credit obligations established when disturbances are proven unavoidable and minimization does not provide for complete direct or indirect impact avoidance.[7] As of November 2014, the Sagebrush Ecosystem Program is working with BLM and USFS to develop a MOU to define roles and responsibilities for implementation of the Credit System on BLM and USFS lands.

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[6] The establishment of the Credit System by the Sagebrush Ecosystem Council is outlined in State statue (NRS 232.162 (7)(e)), and the administration of the Credit System by the Division of State Lands of the State Department of Conservation and Natural Resources is authorized in State statute (NRS 232.162).

[7] US Fish and Wildlife Service. Greater Sage-Grouse Range-Wide Mitigation Framework Version 1.0. September 3, 2014. Page 6.

USFWS Pre-Listing and Endangered Species Act

The Credit System is intended to be consistent with the Greater Sage-Grouse Range-Wide Mitigation Framework[8] (Mitigation Framework), and as such, the Credit System aims to provide regulatory certainty to both Credit Buyers and Credit Developers.

The Sagebrush Ecosystem Program intends for credits generated prior to the listing decision to be considered prelisting mitigation credits and treated as measures to mitigate the impact of *incidental take*, should greater sage-grouse be listed. As of November 2014, the Sagebrush Ecosystem Program is working with the USFWS to enter into a prelisting mitigation agreement that authorizes the use of Credit System credits for mitigation purposes. This agreement would signify that the Credit System can be integrated with other regulatory mechanisms to provide incidental take protection assurances to Credit Developers and Credit Buyers.

The Credit System could be used in listing scenarios as follows:

- In the event of a threatened (not endangered) listing, USFWS may create a 4(d) rule that would exempt a number of activities from ESA restrictions. These would be activities that USFWS determines to minimize the impacts to listed species to the extent that additional federal protections are not required. If a 4(d) rule is issued, it may be possible for activities using mitigation from the Credit System, both credit and debit projects, to be exempt from take requirements. Note that a 4(d) rule could also include exemptions for some agricultural and ranching activities to reduce the burden on farmers and ranchers.
- In the event of either a threatened or endangered listing, and if the Credit System is not included as an exemption in a 4(d) rule, take protection for Credit Buyers may be secured using Incidental Take Permits or Certificates of Participation issued through individual or regional Habitat Conservation Plans (HCPs) created for greater sage-grouse in the State of Nevada, or permittee-responsible mitigation. Any of these regulatory take coverage mechanisms could use the Credit System by specifying that the credit obligation for all debit projects will be determined and offset using the Credit System.
- In the event of either a threatened or endangered listing, and if the Credit System is not included as an exemption in a 4(d) rule, take protection for Credit Developers may be secured using additional types of regulatory mechanisms. More discussion on these regulatory mechanisms is needed and currently underway.

2.1.4 ADMINISTRATIVE TRANSACTION FEES

The Administrator collects transaction fees from Credit Buyers at transfer of credits between accounts (e.g. between Credit Developer and Credit Buyer accounts) in order to cover administrative costs incurred by the Administrator. Administrative costs range from the evaluating and awarding credits to credit projects and verification of credit and debit projects throughout their duration, to executing the annual Credit System adaptive management process. The Administrator maintains and publishes the fee structure and amounts, and regularly reviews the fee structure and amounts through the Credit System adaptive management process. Changes to the fee structure and amounts must be approved by the Oversight Committee. Fees are expected to include a per transfer component and a per credit component.

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[8] US Fish and Wildlife Service. Greater Sage-Grouse Range-Wide Mitigation Framework Version 1.0. September 3, 2014. Page 5. http://www.fws.gov/greatersagegrouse/documents/Landowners/USFWS_GRSG%20RangeWide_Mitigation_Framework20140903.pdf

2.1.5 ACCOUNTING SYSTEM & REPORTING

The Credit System employs a rigorous accounting system that operates on an annual cycle. Credits and debits are tracked according to Credit System reporting and verification standards. See *Section 2.4.2 Credit Project Duration*, *Section 2.4.5 Credit Site Verification*, *Section 2.5.3 Debit Project Duration* and *Section 2.5.5 Debit Site Verification* for more information on credit and debit project reporting and verification standards. The Credit System accounting and reporting system uses the following key tools:

- **Credit System Registry:** Tracks functional acres, credits, debits, and other transactional information.
- **Annual Performance Reports:** Use Credit System Registry outputs and the Credit System adaptive management process to report on the change in functional acres, and the number of credits and debits generated each year, along with other information needed by state and federal regulatory agencies.

Tracking & Accounting

The Credit System tracks the functional acres impacted by anthropogenic as well as those enhanced and protected by credit projects. Each credit is tracked on the Credit System Registry and related to the specific debit project it is used to offset, if applicable. This tracking facilitates annual reporting, verifies the Credit System always generates more credits than debits in any given year, and provides information necessary for effective adaptive management.

The Credit System accounting structure can also account for the functional acres impacted by natural disturbances, such as wildfire, and management actions that do not generate credits for offset. Tracking functional acres impacted by natural disturbances and management actions facilitates a complete understanding of the state of habitat for the greater sage-grouse and provides useful data for adaptive management of the Credit System and other conservation strategies. The quantification of functional acres for calculating credits and debits is accomplished using the HQT, which uses vegetation characteristics collected in the field along with desktop analyses. Pre-natural disturbance vegetation characteristics would not be available and it would not be practical to collect post-natural disturbance vegetation characteristics for large natural disturbances, therefore a proxy assessment of vegetation characteristics would need to be used and there are options that would provide relatively accurate results. See *Section 2.2.1: Habitat Quantification Tool* for additional information on the HQT.

The Administrator will use a basic version of the Credit System Registry initially. Depending on transaction volume and cost, the Administrator may elect to develop a robust Credit System Registry or utilize an established environmental registry to efficiently track large volumes of transactions.

Annual Performance Reports

The Administrator will use the Credit System Registry and adaptive management process to report annually on the performance of the Credit System. See *Section 3.3: Managing the Credit System* for detailed information about the annual reporting process. Annual reports are expected to include the following information:

- Total functional acres lost by anthropogenic disturbances, and natural disturbances if tracked
- Total functional acres protected by credit projects, and management actions if tracked
- Total number of debit and credit projects statewide that are enrolled in the Credit System
- Total debits and credits generated by enrolled projects, and by WAFWA Zone and PMU
- Total credits held in the reserve account
- A description of any credit reversals that occurred over the course of the previous year, including a brief summary of the method and status of replacing invalidated credits
- A description of anticipated improvements to be made to Credit System operations identified through the adaptive management process

2.1.6 ADAPTIVE MANAGEMENT

The Credit System uses a formal, structured adaptive management approach to dealing with uncertainty, using the experience of management and the results of research as an ongoing feedback loop for continuous improvement. The Oversight Committee and Administrator are responsible for implementing the annual adaptive management process with support from the Science Committee and other stakeholders, as described in *Section 3.3: Managing the Credit System*.

The annual adaptive management process focuses on improving the effectiveness of Credit System Manual policy and technical elements, the HQT, and individual management actions used to generate credits by:

- Evaluating Credit System performance data related to changes in functional acres and the volume of credits relative to debits in the Credit System to improve the Credit System Manual and HQT;
- Identifying priorities and conducting research and monitoring, including comparing project success to overall population dynamics; and
- Collecting input on the application and results of 1) the Manual policy and technical elements, and 2) HQT scoring from Credit System participants and cooperating public agencies.

Each year, adaptive management findings are synthesized and improvement recommendations are produced by the Administrator. Significant changes are approved by the Oversight Committee through a public meeting process. Any changes will only apply to new credit and debit projects, thus credits awarded and credit obligations fulfilled through the Credit System will not be impacted by future updates to the Credit System.

2.1.7 PARTICIPANT CONFIDENTIALITY

Some Credit Developers may be concerned about the Credit System publicly disclosing personal information. However, it may also be necessary for federal and state agencies to evaluate individual actions in order to properly assess the effectiveness of the Credit System in reducing threats and providing net benefit to the species. Furthermore, the Credit System is run by the State of Nevada; therefore, certain information must be disclosed to the public in response to Freedom of Information Act (FOIA) requests.

The Credit System will annually publish a Performance Report that describes overall Credit System performance. This Performance Report will be provided to relevant federal and state agencies. To the maximum extent possible under federal, state, and local law, the Credit System will protect against disclosure of personal and confidential information from participants by using a case by case review and determination. Personal and confidential information may include: names, contact information, general and legal description of the enrolled property, grazing practices, land use practices, commercial activities on the land, recreational activities on the land, site-specific species sightings, and site-specific species habitat condition.

Disclosure of Information

In the event that a request for information is made to the Administrator that would result in the possible disclosure of personal or commercial confidential information, the Credit Developer or Credit Buyer will be notified of the request. Additionally, the Credit Developer or Credit Buyer will be provided the opportunity to state in writing why a release of the requested information would constitute a clearly unwarranted invasion of privacy or cause substantial harm to their commercial interest. The USFWS will provide a notice when a FOIA request for records concerning the Credit System is made, and allow the Administrator, Credit Developer or Credit Buyer to prepare a notification requesting that any confidential personal or commercial information be withheld.

2.1.8 RESERVE ACCOUNT MANAGEMENT AND USE OF FINANCIAL ASSURANCES

The Credit System creates a reserve account of credits and requires credit projects to provide financial assurances so that the Administrator can ensure the Credit System generates net benefit even if specific credit projects do not fulfill performance standards throughout the duration of each credit project. Credit projects that do not fulfill performance standards are considered credit reversals.

The reserve account is not a financial assurance method to hold a Credit Developer financially responsible in the event of project failure. Rather, the reserve account includes verified, released credits that are providing greater sage-grouse benefits and have not used to offset debit projects. The reserve account serves as an insurance mechanism for the overall Credit System. Each credit transaction contributes a percentage of credits generated based on the probability of the credits being invalided as described in *Section 2.4.3: Reserve Account Contribution*.

Financial assurances are fiscal mechanisms used to ensure that funds are available for the implementation and long-term management of each credit project, including remedial actions in the event of unintentional reversals, and to promptly replace credits that have been sold but become invalidated due to intentional reversals. Financial assurances can consist of contract terms, such as financial penalties for intentional reversals, and financial instruments, such as long-term stewardship funds and contract surety bonds. See *Section 2.4.6: Financial Assurances* for additional information on financial assurance requirements and guidance.

Reserve Account Management

The Administrator manages the reserve account and uses credits in the reserve account to temporarily cover credits invalidated due to unintentional or unintentional causes as described in this section. Credits in the reserve account are never used to offset debit projects. Credits withdrawn from the reserve account to temporarily cover invalidated credits are transferred back into the reserve account after the invalidated credits that they were withdrawn to temporarily cover are remediated or replaced using financial assurances associated to the invalidated credits. Term credits in the reserve account are permanently withdrawn from the reserve account when the term of the credits has expired.

The Administrator reviews the balance of the reserve credits at least annually. The Administrator at any time may propose adjustments to the required reserve account allocation to be approved by the Oversight Committee as part of the Credit System adaptive management process. The Administrator can propose the required contributions be adjusted upward or downward as needed to account for insufficient or excessive amounts of reserve credits.

Use of Reserve Account and Financial Assurances

Depending on the specific cause and circumstances of a reversal, invalidated credits can be replaced using a combination of the reserve account and financial assurances, as illustrated in Figure 9 below.

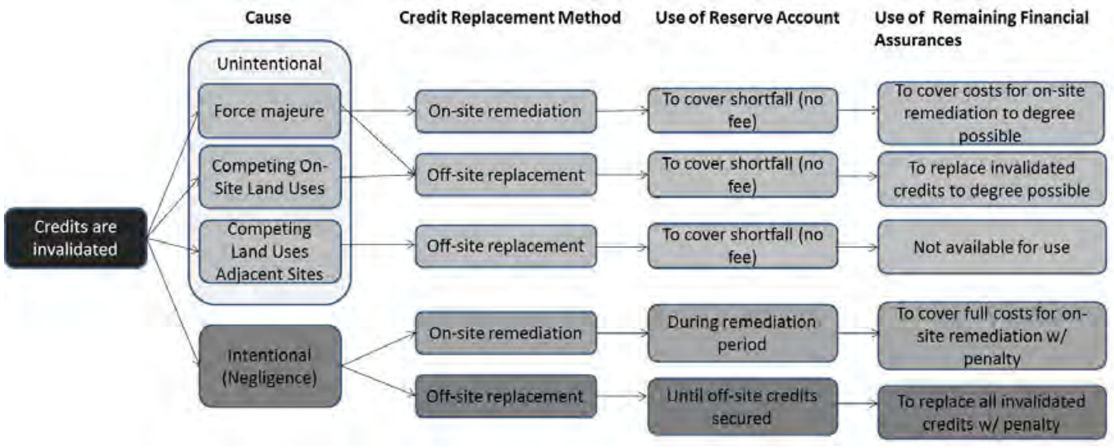

Figure 9: Credit invalidation replacement process

Unintentional reversals

Force Majeure

When credits generated by a credit site are invalided by an extraordinary event or circumstance beyond the control of the Credit Developer, such as wildfire, the Credit Developer is not liable and thus the financial assurances secured for intentional reversals are not available to the Administrator to replace the invalided credits. Instead, the Administrator withdraws credits from the reserve account to cover the invalidated credits at no cost to the Credit Developer. In cases where the credit site can be fully or partially recovered within a reasonable amount of time and cost, the Credit Developer has the option to develop a remedial action plan that is approved by the Administrator. In this situation, financial instruments secured for long-term management and unintentional reversals may be used to pay for activities included in the remedial action plan. See *Section 2.4.6: Financial Assurances* for additional information on financial assurance requirements. If only a portion of the credits are recovered following a *force majeure* event, then payments from financial instruments secured for long-term management and unintentional reversals are reduced according to the amount of credits actually being generated on the ground. The Administrator may use the remaining amount in the project site's financial instruments to purchase credits elsewhere. Any dedicated reserve account credits are returned to the reserve account if the invalidated credits are remediated, assuming all requirements of those reserve account credits are still being met.

In cases where the credit site cannot be recovered within a reasonable amount of time and cost, the Credit Developer has the option to cancel the contract without penalties, but retains the ability to re-enroll the site as a different project at a later time. If the contract is canceled, payments to the Credit Developer cease immediately and the Administrator uses the remaining amount in the project site's financial instrument for long-term management and unintentional reversals to purchase credits from a different credit site.

Competing On-site Land Uses

In the case of an unintentional reversal due to competing land uses on-site, such as *split estate* minerals development, the Administrator will withdraw credits from the reserve account to cover the invalidated credits at no additional cost to the Credit Developer. Similar to the policies described for force majeure events, if the impact of the competing land use reduces credit generation on a credit site, payments are reduced according to the amount of credits actually being generated. The Administrator uses the remaining funds in the project site's financial instrument to purchase credits elsewhere to the extent feasible. If the impact of the competing land use results in the credit site not being able to generate credits as expected, the contract can be canceled without penalties. If the contract is canceled, payments to the Credit Developer cease immediately and the Administrator uses the remaining amount in the project site's financial instrument to purchase credits from a different credit site.

Competing Land Uses on Adjacent Sites

There may be cases where verification shows that competing land uses on sites adjacent to enrolled credit project sites have occurred, which impairs the ability of the enrolled credit project site to generate benefit for the species. The effect of competing land uses on sites adjacent to the enrolled credit project sites are determined using the anthropogenic disturbance curves defined in *Section 3.3.1: Cumulative Anthropogenic Disturbances* in the *HQT Scientific Methods Document*. These occurrences are out of the direct control of the Credit Developer. Therefore in cases of unintentional reversals due to competing land uses on adjacent sites, the Administrator will withdraw credits from the reserve account to cover the invalidated credits at no cost to the Credit Developer. In these cases, the remaining financial assurances for the credit project site are not available to the Administrator to purchase replacement credits. The Credit Developer must continue to maintain habitat function at the project site-scale according to the performance requirements stated in the credit project's Management Plan.

Intentional Reversals

In the case of an intentional reversal, such as not implementing management activities to achieve habitat quality as defined in the Management Plan or intentional mineral development, all payments to the Credit Developer immediately cease. The Credit Developer and Administrator determine if a remedial action plan can be developed or if credits must be replaced off-site. The Credit Developer is responsible to the Administrator for the entire cost of purchasing replacement credits from a different credit site, any associated legal fees, and an additional 10% administrative fee (i.e. contract penalty). If there is a time lag between the intentional reversal and the recovery of the site, or a time lag between the intentional reversal and when the Administrator secures new credit contracts, the Administrator will withdraw from the reserve account for a limited duration to prevent any gaps in coverage for sold credits. The credit withdrawal from the reserve account ceases as credits are acquired to cover the remainder of the contract.

2.1.9 RECOGNITION AND SUPPORT OF EXISTING GREATER SAGE-GROUSE CONSERVATION PROGRAMS

To the extent appropriate, the Administrator may work with the sponsors of existing greater sage-grouse conservation programs to make Credit System tools and operations, such as the HQT, credit accounting and transfer protocols, verification protocols and credit investment strategies available to such programs. The terms under which the Credit System will be available to such programs shall be set forth in agreements between the Administrator and the program sponsors.

2.2 HABITAT QUANTIFICATION AND CREDIT AND DEBIT CALCULATION

This section describes how to calculate Credit System credits, debits and credit obligations, which are the amount of credits required to offset the debits generated by a debit project. The credit obligation is the number of debits generated by a debit project adjusted by a proximity ratio, determined by the proximity between the debit site and offsetting credit site. Credit Developers and Credit Buyers are the primary audience of this section.

Credits and debits represent the functional acre difference between baseline functional acres and post-project functional acres, multiplied by a mitigation ratio that incorporates biologically significant factors that are not captured through the HQT. This section begins with an overview of the HQT, which is used to quantify functional acres for both credit and debit sites. The difference in baseline functional acres and post-project functional acres is the starting point for calculating credits and debits, and guidance for determining baseline functional acres is provided in *Section 2.3.4: Calculating Credit Baseline Habitat Function* and *Section 2.5.4: Calculating Debit Baseline Habitat Function* for credit and debit sites, respectively. Following the overview of the HQT, guidance is provided for determining the mitigation ratio for credit and debit sites, and the credit obligation for debit projects. Lastly, an example calculation of credits and debits beginning with baseline and post-project functional acres is provided.

2.2.1 HABITAT QUANTIFICATION TOOL

The HQT quantifies habitat function for greater sage-grouse habitat in the State of Nevada. Habitat function refers to the role of the habitat in providing life history requirements for greater sage-grouse, and includes the direct and indirect effects of anthropogenic disturbances. Habitat function is expressed as a percent function in relation to fully-functioning habitat for greater sage-grouse, and is multiplied by the area (acres) assessed to calculate functional acres associated to the area assessed.

HQT Framework for Quantifying Habitat Function

The HQT was developed to account for habitat characteristics or attributes which influence sage-grouse habitat selection across multiple scales. These habitat characteristics were based on different orders of selection (Johnson 1980, Stiver et al. 2010), which represent four spatial scales at which habitat attributes influence where sage-grouse reside and obtain resources necessary for survival and reproduction[9]. The HQT assessed habitat quality at four orders.

Range-wide Scale (1st order): The range considered by the Credit System is the geographic range of the sage-grouse population in Nevada.

Landscape Scale (2nd order): Landscape selection is based on the availability of seasonal habitats needed to support a population or subpopulation.

Local Scale (3rd order): Local selection is based on suitability of the habitat within their home range and the effects of anthropogenic disturbances.

Site Scale (4th order): Site selection is based on vegetation structure and composition that provide forage and cover.

See the *HQT Scientific Methods Document* for additional information on the attributes measured at each scale (order), and the methods used to measure those attributes.

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[9] While the term 'selection' may be interpreted as relating to individual bird behavior, in this context the term is applied broadly to describe the four geographic scales at which sage-grouse occur, are organized into populations and use habitat (per Johnson 1980, Connelly et al 2003, Stiver et al 2010). These four scales also correspond to scales at which sage-grouse policy and management are typically implemented (Stiver et al. 2010). Throughout this document, orders of selection will be identified by their descriptive terms (e.g., site scale, local scale, landscape scale).

Functional Acre Calculation

The HQT generates a percent function and a number of functional acres for each seasonal habitat type (breeding, late brood-rearing, and winter) for each *map unit* delineated within a project site. Map units are sub-divisions of the project area based on unique vegetation communities and vegetation structure. Map units are delineated based on variation in habitat attributes assessed by the HQT, such as sagebrush canopy cover, forb abundance and distance to sagebrush cover. Guidance for delineating map units within a credit or debit site is provided in the *HQT Scientific Methods Document*.

The HQT generates a local-scale habitat function score and site-scale habitat function scores for each seasonal habitat type. The product of the local-scale habitat function and site-scale habitat function scores for each seasonal habitat type determines overall habitat function for each seasonal habitat type for a map unit. The overall habitat function for each seasonal habitat type is multiplied by the acreage of the map unit to produce a functional acre value for each seasonal habitat type. Table 4 provides an example calculation of functional acres for each seasonal habitat type for a single map unit.

Table 4: Example calculation of functional acres for a single map unit

Seasonal Habitat Type	Local-Scale Habitat Function	Site-Scale Habitat Function	Overall Habitat Function	Acres	Functional Acre Values
Breeding	80%	60%	48%	500	240
Late Brood-Rearing	80%	0%	0%	500	0
Winter	80%	45%	36%	500	180

Application of the HQT

The Credit System uses the functional acre difference between baseline functional acres and post-project functional acres for each seasonal habitat type as the starting point for calculating credits and debits for each map unit delineated within a project site, including the area indirectly impacted by a debit project. Guidance for determining baseline functional acres is provided in *Section 2.3.4: Calculating Credit Baseline Habitat Function* and *Section 2.5.4: Calculating Debit Baseline Habitat Function* for credit and debit sites, respectively.

The HQT is used consistently throughout the life of a credit project to 1) substantiate the release of credits at the point that the project meets habitat function thresholds, and 2) verify that conditions are being maintained as expected over time. For debit projects, the HQT is used to determine pre-project functional acres before impacts occur, to determine post-project functional acres after impacts occur, and is used as necessary over time to determine if impacts are increased or reduced. Pre-project HQT results for debit projects can be used for up to 5 years after a site has been verified as long as the habitat function is believed to be similar to the previous assessments and no significant changes have occurred on the project site.

Field Data Collection Timing

Site-scale vegetation measurements required by the HQT must be collected during specific times of the year to accurately measure the function of breeding, late brood-rearing, and winter habitat. These vegetation measurements are primarily related to sagebrush, forbs and grasses. The forbs and grasses necessary to sustain greater sage-grouse are often different, or differ in availability, during specific greater sage-grouse life cycle stages. To ensure accurate quantification of the functionality for each seasonal habitat on a site, field work for the collection of forbs and grasses needs to occur during an appropriate season.

Permissible Windows

Credit Developers and Credit Buyers must collect data during the following permissible windows in order for functional acre scores to be official and approved by the Administrator:

Breeding: April 1st through June 15th
Late brood-rearing: July 1st through September 15th
Winter: Anytime

The permissible window may need to be shifted each year due to annual variation in climatic conditions. Shifts of the permissible window will be limited to significant departures from mean climatic conditions, and to no more than a 3 week shift forward or backward from the standard windows above. If the permissible window is shifted, the Administrator will post an announcement on the Nevada Conservation Credit System Website as soon as a determination is made.

Date Confirmation

Credit Developers and Credit Buyers may request written confirmation from the Administrator that their planned field work is scheduled within permissible windows in order in to ensure functional acre scores based on the field data collected will be accepted by the Administrator.

Field Data Outside of Permissible Windows for Planning Purposes

Credit Developers and Credit Buyers may collect field data outside the permissible windows to estimate credit generation and credit obligations for **project planning purposes only**, such as to negotiate options contracts between Credit Developers and Buyers. Credits will not be released for sale based on field data collected outside of permissible windows. Similarly, debit projects are not permitted to develop any area where field data has not been collected during a permissible window when it is needed to generate accurate quantification of habitat function. All credit and debit amounts must be finalized based on field data collected during a permissible window.

All preliminary estimates of habitat function collected outside the permissible windows will be clearly indicated as such. These estimates should also include an indication of when field work will occur during the permissible window. Credit Developers and Credit Buyers should make conservative estimates when using field data collected outside of permissible windows (e.g. under-estimate credits, over-estimate debits). In particular, estimates for forbs, grasses and other attributes that are affected by specific growing seasons should be conservative in order to minimize risk in planning decisions and capital investments.

2.2.2 MITIGATION AND PROXIMITY RATIOS

A mitigation ratio is applied to the functional acre difference between baseline functional acres and post-project functional acres for each map unit within a credit or debit project respectively. See *Section 2.2.1: Habitat Quantification Tool* for additional information on calculating functional acres, and guidance for determining baseline functional acres is provided in *Section 2.3.4: Calculating Credit Baseline Habitat Function* and *Section 2.5.4: Calculating Debit Baseline Habitat Function* for credit and debit sites, respectively. The mitigation ratio incorporates biologically significant factors that are not incorporated into the quantification of functional acres using the HQT.

The mitigation ratio enables credits acquired to offset debits generated by debit projects to achieve net benefits for greater sage-grouse by ensuring the total functional acres of credit acquired are greater than the functional acres of debit. The mitigation ratio incentivizes avoidance of impacts, while encouraging enhancement and protection of habitat in high priority areas.

The mitigation ratio is defined for each map unit delineated within a credit or debit project, including the area indirectly impacted by a debit project, and is based on multiple factors described below. The mitigation ratio is applied to the difference between baseline functional acres and post-project functional acres associated to each map unit for both credit and debit projects, as illustrated in Figure 10. See *Section 2.3.4: Calculating Credit Baseline Habitat Function* and *Section 2.5.4: Calculating Debit Baseline Habitat Function* for determining baseline for credit and debit projects respectively.

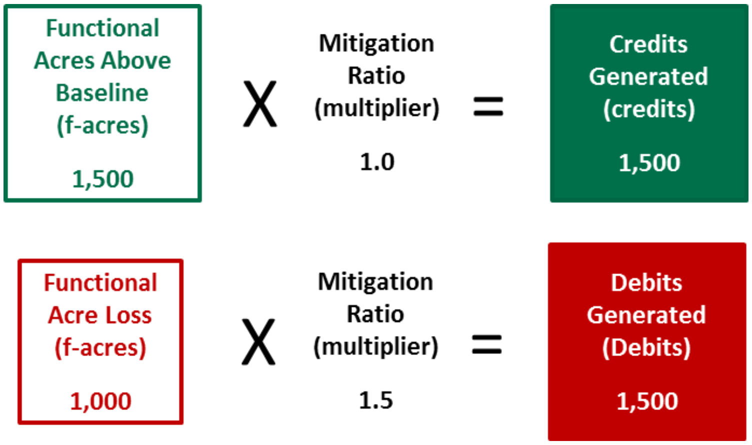

Figure 10: Illustration of calculation of debit and credits

The amount of credits required to offset a debit project, or the credit obligation, is the number of debits generated by the project adjusted by a proximity ratio, determined by the proximity between the debit site and offsetting credit site. The proximity ratio incentivizes credit sites used for mitigation to be in close proximity to debit sites.

Credit and Debit Mitigation Ratios

The Credit System applies a mitigation ratio to credit and debit sites to incorporate 1) estimated space use by greater sage-grouse, and 2) limiting seasonal habitat impacted, negatively or positively.

Management Importance Factor

The management importance factor incorporates estimated space use by greater sage-grouse into the calculation of credits and debits. The management importance factor is determined by the Core, Priority or General Management Area for which the credit or debit is located within, as defined by the Sagebrush Ecosystem Program's Management Categories map depicted in Figure 11. The Core Management Area is the highest conservation priority and the General Management Area is the lowest conservation priority under the management importance factor. Table 5 and Table 6 below provide the management importance factor values for debit and credit sites, respectively. These values will be reevaluated by the SEC after testing pilot projects.

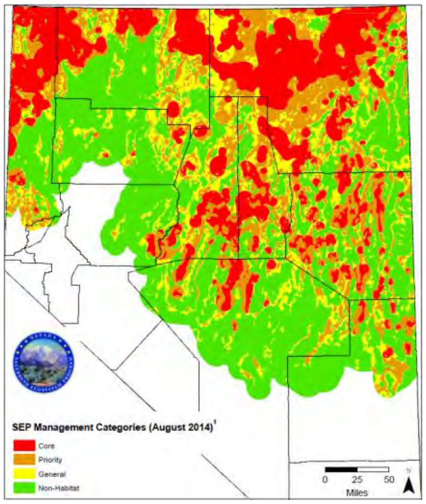

Figure 11: Sagebrush Ecosystem Program's Management Categories map

Table 5: Debit Site Management Importance Factor Values

Category	Factor Value
Core	2.0
Priority	1.5
General	1.0

Table 6: Credit Site Management Importance Factor Values

Category	Factor Value
Core	1.1
Priority	1.0
General	0.85

In accordance with the 2014 Nevada Greater Sage-Grouse State Plan Table 3-1, disturbances located in Non-Habitat Management Areas require evaluations to determine whether the disturbance will cause an indirect impact to Core, Priority, or General Management Areas. If the evaluation determines that an indirect impact will occur in a Core, Priority or General Management Area, the management importance factor of that area is applied to the indirect disturbance area of the debit project.

If a single map unit crosses two or more management importance categories, the management importance factor value used is an area-weighted average based on the management categories included in the map unit (see Figure 15 for an example of calculating an area-weighted average value).

Limiting Seasonal Habitat Factor

Greater sage-grouse depend on different types of habitat to accommodate different phases of their life cycle - breeding, late brood-rearing and winter. If one or more of these habitat types is impacted to the point that it can no longer support the corresponding life cycle phase, then the entire area is potentially no longer suitable for the greater sage-grouse. The limiting seasonal habitat factor incorporates the effect of a credit or debit project on each seasonal habitat type relative to the amount of the specific seasonal habitat currently available to the affected population within and surrounding the project site. The proportion of seasonal habitat affected by a credit or debit project is determined using a seasonal habitat map that excludes all disturbed habitat and non-habitat within and surrounding the project site due to existing anthropogenic disturbances, recent fire, and other factors. Including concepts of existing anthropogenic disturbances and recent fire into limiting habitat helps to provide the relative value of these habitats when some has already been lost to disturbance. See *Section 3.2.3: Limiting Seasonal Habitat* in the *HQT Scientific Methods Document* for additional information including the analysis method and area within and surrounding the project included in the analysis.

A limiting seasonal habitat factor value is incorporated in the mitigation ratio if the project impacts a seasonal habitat type with less than the proportions defined in Table 7, within and surrounding the project site.

Table 7: Limiting seasonal habitat proportion of analysis window thresholds

Breeding & Winter	**Late Brood-Rearing**
Proportion of Analysis Window	Proportion of Analysis Window
<40%	<4%

If the project impacts a limiting seasonal habitat, as defined in Table 7, the equation associated with that seasonal habitat type in Table 8 is used to determine the limiting seasonal habitat factor value.

Table 8: Limiting seasonal habitat factor value equations

Breeding & Winter	**Late Brood-Rearing**
Ratio Equation	Ratio Equation
$(.4\text{-}proportion)*100$	$\frac{1}{proportion}$

Combining Factors to Determine Credit and Debit Mitigation Ratio

The management importance and limiting seasonal habitat factors are summed to determine the overall mitigation ratio for a site, as per Equation 1.

Equation 1: Combining factor values to determine overall debit or credit mitigation ratio

$$\begin{aligned}&\mathbf{\mathit{Mitigation\ Ratio}}\\&\quad = \mathbf{\mathit{Habitat\ Importance\ Factor\ Value}}\\&\quad + \mathbf{\mathit{Limiting\ Seasonal\ Habitat\ Factor\ Value}}\end{aligned}$$

Proximity Ratio

The credit obligation is the number of credits that must be purchased to offset the debits generated by a debit project. The credit obligation is the number of debits calculated using the debit ratio above adjusted by a proximity ratio, determined by the proximity between the debit site and offsetting credit site.

The proximity ratio incentivizes debit projects to offset their credit obligation (purchase credits) in close proximity to debit sites in order to increase the likelihood that the mitigation serves the same populations of birds that are adversely impacted by the debit site. The WAFWA Management Zones and the NDOW PMU maps illustrated in Figure 12 and Figure 13. respectively are used to determine whether the debit and credit sites 1) have no population connection, 2) are connected through population dispersal, or 3) impact and benefit a single population.

- If the debit and credit sites are located within one PMU, they are considered to be relevant to a single population.
- If the debit and credit sites are located within the same WAFWA management zone, but not the same PMU, they are considered to be connected through population dispersal.
- Finally, if the debit and credit sites are located in different WAFWA management zones they are considered to have no population connection.

The proximity ratio value associated with each of these categories is in the Table 9.

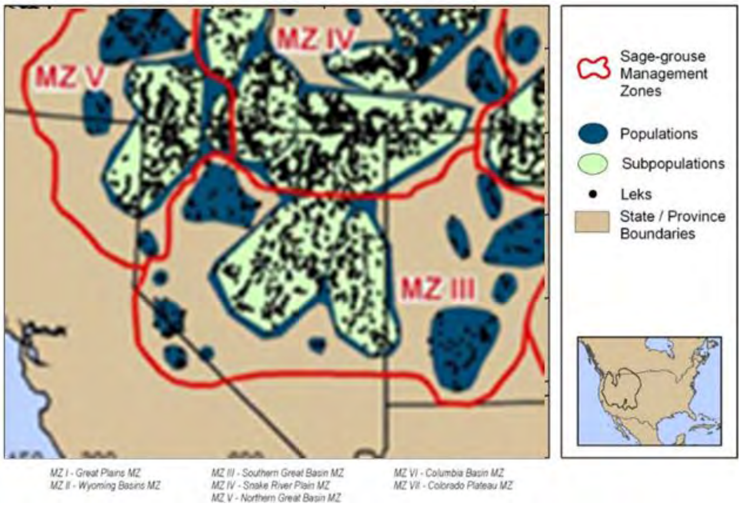

Figure 12: WAFWA Management Zones for Greater and Gunnison sage-grouse

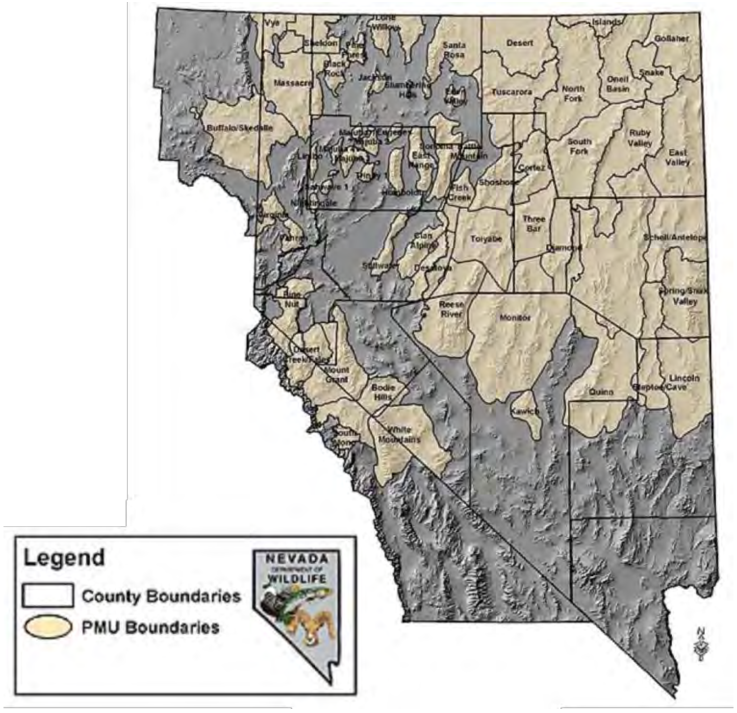

Figure 13: NDOW Population Management Units

Table 9: Proximity Ratio Values

Category	Factor Value
No population connection between credit and debit sites (different WAFWA Management Zone)	1.50
Credit and debit sites connected through population dispersal (same WAFWA Management Zone)	1.25
Credit and debit sites located within a single population (same PMU, even if in different WAFWA Management Zones)	1.00

Preferred conservation areas are expected to be defined and incorporated into the State of Nevada's strategic action plan in 2015. After preferred conservation areas are defined, waiving the proximity ratio for debit projects that acquire credit offsets from these areas but outside of the PMU or WAFWA zone for which the debit is located will be considered. This exception will be considered as an additional method to prioritizing mitigation in areas that best serve the greater sage-grouse at a landscape-scale instead of focusing exclusively at the individual population level.

Credit Obligation

The credit obligation for each debit project is determined by multiplying the number of debits by the proximity ratio, as per Equation 2.

Equation 2: Credit obligation for debit projects

$$Credit\ Obligation = Debits\ *\ Proximity\ Factor\ Value$$

2.2.3 CREDIT AND DEBIT CALCULATION

The amount of credits and debits generated from a project is determined by the greatest benefit for credit projects or the greatest impact for debit projects. The greatest benefit or impact from a project is the sum of the greatest benefit or impact determined for each delineated map unit within a credit or debit project. The greatest benefit or impact associated with each map unit is the largest product of the difference between baseline functional acres and post-project functional acres and the unique mitigation ratio associated to each seasonal habitat type. See *Section 2.2.1: Habitat Quantification Tool* for additional information on calculating functional acres, and guidance for determining baseline functional acres is provided in *Section 2.3.4: Calculating Credit Baseline Habitat Function* and *Section 2.5.5: Calculating Debit Baseline Habitat Function* for credit and debit sites, respectively.

An example calculation of the credits generated from a credit project with three map units is provided in Table 10. The left most group of columns contain the difference between baseline functional acres and post-project functional acres for each seasonal habitat type, and the next group of columns moving the right contains the unique mitigation ratio for each seasonal habitat type. The next group of columns to the right contains the potential credit value of each seasonal habitat type, which is the product of the difference between baseline functional acres and post-project functional acres and the unique mitigation ratio for each seasonal habitat type. The last column contains the credits generated by each map unit, which is the highest seasonal habitat credit value circled in red. The sum of the credits generated by each map unit is the total credits generated by the project.

Table 10: Example credit calculation for a project with three map units and enhancement and protection of limiting late brood-rearing habitat

Map Unit	Breeding F-Acres Above Baseline	Late Brood-Rearing F-Acres Above Baseline	Winter F-Acres Above Baseline	Breeding Mitigation Ratio	Late Brood-Rearing Mitigation Ratio	Winter Mitigation Ratio	Breeding Value	Late Brood-Rearing Value	Winter Value	Credits Generated
Map Unit 1	6	15	3	.95	25.95	.95	6	389	3	390
Map Unit 2	15	0	20	.95	25.95	.95	14	0	19	19
Map Unit 3	10	0	7	.95	25.95	.95	10	0	7	10
									Total Project	**419**

2.3 CREDIT PROJECT REQUIREMENTS & ADDITIONALITY PROVISIONS

This section describes requirements including additionality provisions for credit projects to ensure credit projects provide benefits beyond those that would be achieved if the project and associated management actions had not taken place. Additionality provisions address credit projects on public lands, credit projects that have received public funds, and *stacking* of multiple credit types. Credit Developers are the primary audience of this section. Specifics related to Credit Buyers are outlined in *Section 2.5: Credit Obligation Provisions and Credit Investment Strategies*.

2.3.1 CREDIT SERVICE AREA

Figure 14: Greater sage-grouse service area

The Credit System service area is the mapped geographic region where credits can be generated and will be tracked and reported. The service area designation has important implications for the viability of the Credit System transactions and for the ability of the Credit System to generate a net benefit for greater sage-grouse habitat from the impacts from anthropogenic disturbances.

The current SGMA is the Credit System service area, and the 2014 SGMA map is provided in Figure 14 as an example. The boundaries of this management area are based on the range of the species in the State of Nevada and are aligned with State of Nevada development project review requirements for greater sage-grouse.

While the Service Area broadly defines the domain of the Credit System, mitigation ratios establish incentives to offset debits using credits generated in close proximity to debit sites. *Section 2.2.2: Mitigation and Proximity Ratios* describes how the WAFWA Management Zones and the NDOW PMUs, depicted in the Figure 12 and Figure 13 respectively, are incorporated into the proximity ratio. In addition, three Management Categories are also incorporated into the mitigation ratios to encourage the generation of credits and discourage debits in Core and Priority Management Areas, which are estimated to have high space-use by greater sage-grouse. Credits and debits will be tracked in the Credit System Registry and reported by the Administrator by WAFWA Zones and PMUs.

2.3.2 CREDIT PROJECT MANAGEMENT ACTION TYPES

To achieve conservation needs and facilitate recovery of greater sage-grouse, the Credit System defines two credit project management action types:

1) **Habitat Stewardship** – Maintenance of high quality habitat currently used by or in close proximity to habitat used by greater sage-grouse, or manipulation of existing habitat to increase specific habitat functionality. An example project could be placing a conservation easement on existing high quality habitat and committing to maintaining that high quality for the full duration of the credit project. Another example project could be, and improvement of medium quality habitat through a prescribed grazing plan on existing rangeland, and committing to maintaining the post-project habitat function for the duration of the credit project.
2) **Habitat Restoration** – The reestablishment of ecologically important habitat and other ecosystem resource characteristics and functions at a site where they have ceased to exist or where they exist in a substantially degraded state. Examples include the reestablishment of useable greater sage-grouse habitat on abandoned mining claims, eradication of cheatgrass, removal of power line towers no longer in use, or restoration of a wet meadow that is currently not functioning properly.

Riparian Properly Functioning Condition Assessment

A riparian properly functioning condition (PFC) assessment is required for riparian areas included in a credit project. The results of the assessment in report format including the information from the field forms, map, riparian plant list, and photographs must be included in the Management Plan associated with the credit project. The assessment is intended to inform the Credit Developer and Administrator of the ecosystem health of the riparian areas and thus the risk of generating credits from those areas. The Credit Developer is not required to implement management actions to increase the functioning condition of riparian areas. However, the habitat function of riparian areas as measured by the HQT is likely to decrease when those areas are nonfunctional or functional at risk. Credit Developers are encouraged to implement management actions to achieve properly functioning condition to reduce the risk (as identified by the PFC assessment) of credits becoming invalidated.

2.3.3 CREDIT SITE ELIGIBILITY

To be eligible to participate in the Credit System, credit sites must meet the eligibility criteria defined below.

Service Area

All credit sites must be located within the Credit System Service Area. See *Section 2.3.1 Credit Service Area* consideration for additional information.

Ownership & Stewardship

Credit Developers must attest to their current ownership, tenure or use rights, and past land management and land uses over the previous 10 years. . On federal lands, credit developers must have an approved request or application depending on the land protection instrument.

Minimum Performance Standards

The Credit System requires that credit sites meet minimum performance standards related to habitat function and space use for the greater sage-grouse in order to be eligible to generate and release credits. The following minimum performance standards are based on post-project habitat function and must be met at all three scales in order to ensure credit sites are fulfilling the needs of greater sage-grouse at each scale:

- **Landscape-scale** – Credit projects must be located within the Core, Priority or General Management Areas using the SEP's current Management Categories map.
- **Local-scale** – Anticipated local-scale, post-project habitat function (area-weighted average across all map units) determined using the HQT must be greater than or equal to 20%.
- **Site-scale** – Anticipated site-scale post-project habitat function (area-weighted average across all map units using maximum seasonal habitat function associated to each map unit) determined using the HQT must be greater than or equal to the relevant site-scale regional standard habitat functions plus 10% (area-weighted average across all map units using the relevant seasonal habitat type regional standard habitat function). See *Section 2.3.4: Calculating Credit Baseline Habitat Function* for

Area-weighted average is the sum of products of Habitat Function and Area for each map unit divided by total area.

Step 1: Calculate product of habitat function and area, and total area

	Habitat Function	Acres	Product of Habitat Function and Area
Map Unit #1	70%	100	70
Map Unit #2	50%	500	250
Total		**600**	**320**

Step 2: Divide the sum of products of habitat function and area for each map unit by total area

Area-weighted Average Habitat Function = 320/600 **= 53%**

Figure 15: Definition of and an example calculation of area-weighted average habitat function for a credit site with two map units

site-scale regional standard habitat functions, and Figure 15 for additional detail on calculating area-weighted averages.

Additionality

Credit Developers must demonstrate that the performance standard defined for the credit site in the Management Plan exceeds what is otherwise required by federal, state, and local regulations and statutes. Credit Developers must also describe how federal funds have been previously or are currently used to support the development and management of the credit project site. Credit Developers must demonstrate that the credit project site will provide additional benefit to the species above and beyond those generated through the application of existing federal funds or participation in other credit markets. See *Sections 2.3.5* through *2.3.8* for additional information on additionality provisions.

No Imminent Threat

There cannot be evidence supporting imminent threat of direct or indirect disturbance by land uses that will cause the habitat function of the total credit site to be less than the minimum performance standard referenced above as measured by the HQT. Recently acquired subsurface rights, development plans (e.g. a building permit recently submitted or National Environmental Policy Act (NEPA) documents currently under development), or development designations (e.g. renewable energy zone or transmission corridor) would constitute proof of imminent threat that may disqualify a credit site from participating in the Credit System. Proper grazing practices are not anticipated to pose an imminent threat of disturbance. However, in order to develop credits on public land within a grazing allotment, the Credit Developer must either be the permittee or have an agreement with the permittee that are necessary to ensure grazing practices are compatible with the performance standards defined in the Management Plan associated with the credit project.

Site Protection

Credit Developers must show evidence of site protection for the duration of the contract period. A Participant Contract that commits to maintain habitat function above the minimum performance standard is the minimum level of site protection. The Participant Contract includes contractual language and references any other legally binding agreements, such as conservation easements.

Financial Assurances

Credit Developers must commit to financial assurances in the form of contract terms and financial instruments. Financial assurances are specifically defined in each Credit Developers' Participant Contract with the Credit System and associated Management Plan. See *Section 2.4.6: Financial Assurances* for additional information.

Accuracy

Credit Developers must attest to the accuracy of the information provided in all documentation.

2.3.4 CALCULATING CREDIT BASELINE HABITAT FUNCTION

Credit project baseline habitat function is the starting point from which the functional acre difference relative to post-project functional acres is calculated. The difference between a project's post-project functional acres and the baseline functional acres are multiplied by the mitigation ratio to determine the credits generated for each map unit within a credit project. The resulting sum of the functional acres of the map units is the total credits for the project. See *Section 2.2.2: Mitigation and Proximity Ratios* for additional information on determining mitigation ratios.

The credit baseline habitat function is based on the pre-existing local-scale habitat function and the typical site-scale habitat function for the relevant region and habitat type to account for the avoided risk of potential threats that would degrade habitat function if the project was not implemented. In addition, using the typical site-scale habitat function instead of pre-existing site-scale habitat function rewards Credit Developers who have demonstrated stewardship and enables credits to be generated by credit projects that will maintain and protect currently high quality habitat. See *Section 2.2.1: Habitat Quantification Tool* for description of scales. Credit baseline habitat function is calculated by multiplying

- Local-scale, pre-project habitat function as determined by the HQT, and
- Site-scale, regional standard habitat function as defined in Table 11.

The credit site-scale, regional habitat functions shown in Table 11 are used for the WAFWA Zone and seasonal habitat type associated to each map unit. These site-scale regional standard habitat functions are based on median habitat function values, and these values and spatial delineations will be reevaluated in the future as additional site-scale data on existing conditions and more effective methods of delineating habitat throughout the State of Nevada become available.[10]

Table 11: Site-scale regional standard habitat functions

		WAFWA Management Zones		
		MZ III	MZ IV	MZ V
SEASONAL HABITAT TYPES	Breeding	30%	30%	20%
	Late Brood-Rearing	20%	30%	20%
	Winter	65%	60%	60%

The winter regional standard habitat function values in Table 12 are expected to be adjusted in 2015. The current values are expected to be higher than appropriate because the winter scoring curves currently in the HQT and which were used to inform these baseline values do not entirely incorporate snow depth. The values in this table and the HQT will be adjusted at the same time in order to avoid impacting the relative value of winter habitat quantified before and after this change.

An example credit baseline habitat function calculation is illustrated in Table 12 for a map unit with high pre-project local-scale habitat function and a 20% site-scale regional standard habitat function.

Table 12: Example credit baseline habitat function calculation

Local-scale Pre-Project Habitat Function	**Site-scale Regional Standard Habitat Function**	**Credit Baseline Habitat Function**
80%	20%	16%

Additional Credit Baseline Habitat Function Considerations

Credit projects on public lands, or sites currently or previously participating in a federal funding program, or currently generating credits under other *ecosystem service* program or market, may require an adjusted credit baseline habitat function as defined by the following sections.

2.3.5 DEVELOPING CREDITS ON PUBLIC LANDS AND OTHER DESIGNATIONS

The Credit System allows for credits to be generated on public lands (e.g. BLM, Forest Service, State of Nevada trust lands etc.) or other lands already under permanent conservation restrictions (e.g. existing conservation easements) for mitigation purposes if the proposed credit project would add additional benefit above and beyond what would be achieved under the existing land designation or planned and funded conservation actions. Credit projects on public land are able to meet additionality requirements of the Credit System if the Credit Developer can demonstrate that verifiable benefit using the HQT can be attained by the credit project.

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[10] The site-scale regional standard habitat function values below are based on BLM's Assessment, Inventory, and Monitoring (AIM) data and adjusted for identified bias in the data set for the use as regional standard within baseline calculations in the Credit System.

In order to generate credits on public lands, the Credit Producer must have authorization from the relevant public land management agency, under which the public land manager maintains management authority over the land.

2.3.6 PARTNERING WITH FEDERAL PROGRAMS ON PRIVATE LANDS

The Credit System allows for credits to be generated on private lands currently or previously participating in a federal funding program (e.g., U.S. Department of Agriculture (USDA) Farm Bill conservation programs). Guidance for determining the number of potential credits on sites that are currently or have previously participated in a federal funding program is provided below. There are two discrete time periods when payments may be partnered with federal funds including 1) when a current federal contract is still in effect, and 2) after a previous federal contract has expired.

Where conservation values have already been permanently protected or restored under other federal programs benefitting the greater sage-grouse, the Credit Developer can only receive credit for conservation values if enrollment of the credit site in the Credit System would create additional conservation benefit above and beyond the terms of the original agreement.

During an Existing Federal Contract

Within an existing federal contract, a Credit Developer can receive credits for additional habitat benefit generated. The allocation of credits on affected acreage will be proportionate to the non-federal contribution to the conservation benefit for sage-grouse. For example, acreage capable of producing ten credits, but with a fifty percent (50%) federal contribution, will be allocated five credits. This rule only applies to the portion of the benefit on a particular credit site that can be attributed to federal funds. The rest of the benefit is fully creditable.

Following a Federal Contract

A Credit Developer may receive full credit for long-term or permanent contract extension, management or protection agreements following expiration of a federally-funded contract. These long-term contract extensions and permanent conservation agreements could be entered into contemporaneously with execution of the underlying contract or thereafter, but these provisions (and Credit System credits) would not take effect until after the expiration of the underlying contract.

2.3.7 STACKING CREDIT TYPES

Although the Credit System currently only supports the generation and sale of one type of credit (e.g. greater sage-grouse credits), the Credit System allows for multiple credit types to be generated from spatially overlapping areas. However, the amount of each type of credit generated must be based on additional habitat function maintained compared to the habitat function maintained for other credit types. If a site under the Credit System is currently or has previously generated and sold credits under a different ecosystem service program or market (i.e. carbon, water quality, etc.), then restrictions related to partnering with federal funds during existing or following previous federal contracts apply.

In the future, the Credit System may expand to support the generation and sale of credits for other species and resources (e.g. mule deer) in addition to greater sage-grouse. Similar to restrictions on generating credits within a federally-funded contract or on public lands, Credit Developers would be able to generate and sell credits for different species and resources if they demonstrate additionality of specific conservation and management practices. A Credit Developer would not be eligible to sell multiple habitat credits from a single management practice. However, additional and unique management practices undertaken for a particular species would be eligible to generate additional credits. In order to demonstrate additionality for different species and resources, the Credit System will need to quantify and track habitat benefits for each species or resource. HQTs will need to be developed to provide habitat function scores for multiple species on a single project site. The species that receives the highest pre-project score will be the focus of the initial project design. Then, any additional and unique management actions built into that project design in order to generate function for other species or resources will be considered additional, and can be sold as separate credits under the Credit System.

2.3.8 INTEGRATION WITH CCA/CCAAS

Credit Developers enrolled in Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreement with Assurances (CCAAs) can enroll in the Credit System and generate credits if the benefits generated are additional to the minimum conservation measures required by the CCA or CCAA. Credit projects previously enrolled in a CCA or CCAA must work with the Administrator to determine an appropriate site-scale credit baseline, such as pre-project conditions, considering the existing CCA or CCAA. This site-scale credit baseline adjustment should consider the increased additionality and durability resulting from securing conservation benefits through a long-term or permanent credit project that goes beyond the duration of the CCA or CCAA.

2.4 CREDIT DURABILITY PROVISIONS

This section describes credit project durability provisions to ensure credit projects are producing expected outcomes for their entire duration. Durability provisions include legal, financial and Credit System management mechanisms. Credit Developers are the primary audience of this section.

2.4.1 CREDIT SITE PROTECTION

All participating credit projects are required to complete and sign a Participant Contract and accompanying Management Plan that assigns responsibility for meeting monitoring, reporting and verification requirements of each project to the Credit Developer for the duration of the project. Additional information on credit project duration is provided in *Section 2.4.2: Credit Project Duration*. The Participant Contract is the legal agreement between one or more Credit Developers and the Administrator that defines obligations of the Credit Developers and secured financial assurances, binds a participating credit site to a Management Plan, and lays out the relevant terms and conditions for the development of credits under the Credit System. This includes habitat function performance standard, financial assurances for long-term management and intentional reversals, and other provisions related to the signatories.

Additional site protection measures, such as easements or public land use designations on private and public lands respectively, can reduce the probability of competing land uses invaliding the credits generated on the credit site. Reserve account contributions for individual projects reflect these considerations – the probability of competing land uses, the level of risk of the specific site protection mechanism secured, and the unique terms secured for each credit project. The level of risk then determines the reserve account contribution amount required of each project, which creates an incentive to increase land protection and select sites less likely to be affected by other uses. The increased contribution amount also helps ensure the Reserve Account is capable of covering invalidated credits regardless of the site protection measures in place. See *Section 2.4.3: Reserve Account Contribution* for more information on the competing land use factor including how the probability of a reversal from competing land uses is determined.

2.4.2 CREDIT PROJECT DURATION

Credit project duration is the length of time that the Credit System recognizes a project. Credit project duration is the length of time that a Credit Developer has committed to enhancing and maintaining habitat function as stated in credit project's Participant Contract and Management Plan. The duration of credit projects can be either limited term or in perpetuity, and limited term credit projects can be renewed within the Credit System after the credit project duration expires.

. The minimum credit project duration is 10 years and the maximum project duration is in perpetuity. Project duration is defined in 5 year increments. Thus, project duration can be 10, 15, 20, 25 years, and so on, up to and including in perpetuity. The rationale behind the 10 year minimum is based on scientific opinion that rapidly changing habitat function can be detrimental to populations. Longer-term credit projects are preferable and credits from long-term projects are anticipated to attract greater market demand, as Credit Buyers are required to match credit project duration to the expected duration of the debit project, which includes the time required to allow species to begin to use the site after the debit project. See below for matching of duration discussion.

Credit Developers define project duration in the Participant Contracts and Management Plans submitted to the Administrator. Upon expiration of the duration of the credit project, the Credit Developer can elect to renew the project under the Credit System. Renewal entails developing a new Management Plan, using the current HQT and the Credit System Manual policy and technical requirements that are approved at the time of renewal to assess the habitat function and amount of credit generated by the site. Renewal also requires a qualified, third-party verification. See *Section 2.4.5: Credit Site Verification* for additional information on credit site verification. If the project is not renewed, the Credit System no longer recognizes credits after the end of the project duration.

2.4.3 RESERVE ACCOUNT CONTRIBUTION

A percentage of credits generated by a credit projects are transferred into the reserve account at the time that credits are transferred to a Credit Buyer's account. Credits in the reserve account may be used to temporarily cover credits invalidated from intentional and unintentional reversals in order to ensure there are always more credits than debits in the Credit System. The percentage of credits that a credit project contributes to the reserve account is determined by the probability of the credits on that site becoming invalidated unintentionally, which creates an incentive for the Credit Developer to reduce the risks that could invalidate those credits. The use of the reserve account and financial assurances is defined in *Section 2.1.7: Reserve Account Management and Use of Financial Assurances*.

The reserve account checklists determine the unique contribution amount for each credit project, taking the sum of the numeric values assigned to each of the factors defined below. As described in greater detail below and illustrated in Equation 3, the total reserve account contribution percentage consists of a standard base contribution and additional contributions related to the probability of adverse impacts from wildfire and competing land uses. As shown in Equation 4, the total reserve account contribution percentage is multiplied by the total number of credits transferred to a Credit Buyer's account to determine the total reserve account contribution amount for each credit transfer. The credit site must have sufficient credits available to fulfill the amount transferred to the Credit Buyer's account and the reserve account contribution.

Equation 3: Total reserve account contribution percentage equation

$$\begin{aligned}\textit{Total Reserve Account Contribution Percentage} \\ &= \text{Standard } \textit{Base Contribution Percentage} \\ &+ \textit{Probability of Adverse Impacts from Wildfire Percentage} \\ &+ \textit{Probability of Competing Land Uses Percentage}\end{aligned}$$

Equation 4: Total reserve account contribution percentage equation

$$\begin{aligned}\textit{Total Reserve Account Contribution Amount} \\ &= \textit{Credits Transferred to Credit Buyer} \\ &* \textit{Reserve Account Contribution Percentage}\end{aligned}$$

Base Contribution

The base reserve account contribution for all credit projects is 4% of the credits generated on-site that are transferred to a Credit Buyer's account. The base contribution is required due to the inherent uncertainty in the measurement and estimation of the long-term benefits of credit projects due to force majeure events, climate change, and other circumstances.

Probability of Adverse Impacts from Wildfire

In addition to the base reserve account contribution, a portion of each transfer of credits to a Credit Buyer's account is transferred into the reserve account to be available to temporarily cover credits invalided by wildfire, the predominant force majeure event anticipated to affect greater sage-grouse habitat in the State of Nevada. For each transfer of credits that occurs, a contribution for wildfire is determined by the credit site's:

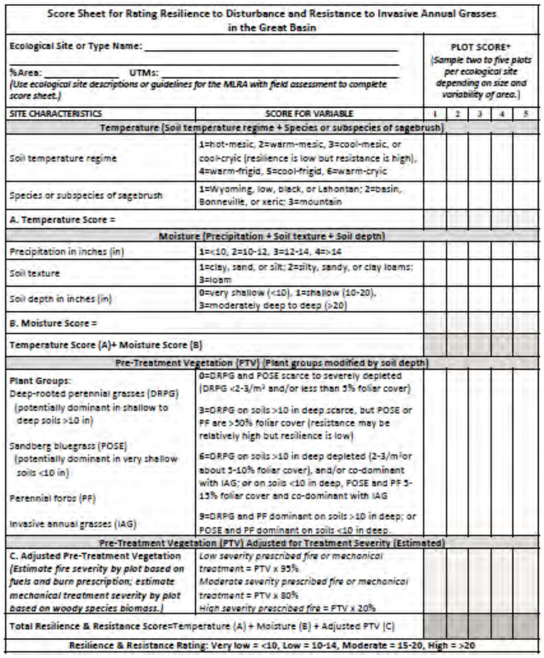
1) Resistance to invasive annual grasses and resilience following wildfire
2) Ability to control wildfire

The Ability to Control Wildfire factor is currently not required because the score card is not currently available developed and adopted by SEC. The score card is expected to be developed in 2015 and included in a future version of the Manual. The description of the factor is included below as a place holder for the expected inclusion of this factor once the scorecard is available.

Resistance & Resilience

Using concepts of resistance and resilience to determine the reserve account contribution encourages credit sites to be located in areas that are less likely to be negatively affected by fire and more likely to recover from disturbances and helps to ensure that the reserve account is capable of covering credits invalidated based on natural disturbances from wildfire.[11]

The resistance to invasive annual grasses and resilience following wildfire is determined using the Miller et al. 2014 (Score Sheet for Rating Resilience to Disturbance, Resistance to Annual Invasive Grasses, and the Suitability of an Ecological Site or Type for Treatment) field guide and score sheet illustrated in Figure 16.[12] Variables defined in the score card produce a field assessment with scoring based on soil temperature, moisture indicators, and vegetation. Credit projects often include more than one ecological site type, and scores are determined for each ecological site type or grouping of similar ecological sites within the credit project area. The score for each ecological site type within the credit project area has a range of 0 – 26, with a score of <10 = Very Low; 10 -14 = low; 15 – 20 = Moderate; and >20 = High. A weighted score, based on the proportion of the area within each ecological site type is calculated for the credit project area. Table 13 provides the reserve account contribution percentage based on the weighted score for the credit project site.



Score Sheet for Rating Resilience to Disturbance and Resistance to Invasive Annual Grasses in the Great Basin						
Ecological Site or Type Name: ______ **%Area:** ______ **UTMs:** ______ *(Use ecological site descriptions or guidelines for the MLRA with field assessment to complete score sheet.)*		**PLOT SCORE*** *(Sample two to five plots per ecological site depending on size and variability of area.)*				
SITE CHARACTERISTICS	SCORE FOR VARIABLE	1	2	3	4	5
Temperature (Soil temperature regime + Species or subspecies of sagebrush)						
Soil temperature regime	1=hot-mesic, 2=warm-mesic, 3=cool-mesic, or cool-cryic (resilience is low but resistance is high), 4=warm-frigid, 5=cool-frigid, 6=warm-cryic					
Species or subspecies of sagebrush	1=Wyoming, low, black, or Lahontan; 2=basin, Bonneville, or xeric; 3=mountain					
A. Temperature Score =						
Moisture (Precipitation + Soil texture + Soil depth)						
Precipitation in inches (in)	1=<10, 2=10-12, 3=12-14, 4=>14					
Soil texture	1=clay, sand, or silt; 2=silty, sandy, or clay loams; 3=loam					
Soil depth in inches (in)	0=very shallow (<10), 1=shallow (10-20), 3=moderately deep to deep (>20)					
B. Moisture Score =						
Temperature Score (A)+ Moisture Score (B)						
Pre-Treatment Vegetation (PTV) (Plant groups modified by soil depth)						
Plant Groups: Deep-rooted perennial grasses (DRPG) (potentially dominant in shallow to deep soils >10 in) Sandberg bluegrass (POSE) (potentially dominant in very shallow soils <10 in) Perennial forbs (PF) Invasive annual grasses (IAG)	0=DRPG and POSE scarce to severely depleted (DRPG <2-3/m² and/or less than 5% foliar cover) 3=DRPG on soils >10 in deep scarce, but POSE or PF are >50% foliar cover (resistance may be relatively high but resilience is low) 6=DRPG on soils >10 in deep depleted (2-3/m² or about 5-10% foliar cover), and/or co-dominant with IAG; or on soils <10 in deep, POSE and PF 5-15% foliar cover and co-dominant with IAG 9=DRPG and PF dominant on soils >10 in deep; or POSE and PF dominant on soils <10 in deep.					
Pre-Treatment Vegetation (PTV) Adjusted for Treatment Severity (Estimated)						
C. Adjusted Pre-Treatment Vegetation ***(Estimate fire severity by plot based on fuels and burn prescription; estimate mechanical treatment severity by plot based on woody species biomass.)***	*Low severity prescribed fire or mechanical treatment = PTV x 95%* *Moderate severity prescribed fire or mechanical treatment = PTV x 80%* *High severity prescribed fire = PTV x 20%*					
Total Resilience & Resistance Score=Temperature (A) + Moisture (B) + Adjusted PTV (C)						
Resilience & Resistance Rating: Very low = <10, Low = 10-14, Moderate = 15-20, High = >20						

Figure 16: Miller et al. 2014 score sheet

Table 13: Resistance and Resilience reserve account categories and contribution percentages

Score sheet Score	Contribution Percentage
>20	0%
15-20	1%
10-14	2%
<10	4%

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[11] Chambers, Jeanne C.; Pyke, David A.; Maestas, Jeremy D.; Pellant, Mike; Boyd, Chad S.; Campbell, Steven B.; Espinosa, Shawn; Havlina, Douglas W.; Mayer, Kenneth E.; Wuenschel, Amarina. 2014. Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: A strategic multi-scale approach. Gen. Tech. Rep. RMRS-GTR-326. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 73 p.

[12] Miller, Richard F.; Chambers, Jeanne C.; Pellant, Mike. 2014. A field guide for selecting the most appropriate treatment in sagebrush and piñon-juniper ecosystems in the great basin: Evaluating resilience to disturbance and resistance to invasive annual grasses, and predicting vegetation response.. Gen. Tech. Rep. RMRS-GTR-322 REVISED. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 66 p.

Ability to Control

Factoring the ability to control wildfire to into the overall reserve account contribution for credit projects encourages sites to be placed where natural and human-created features improve the ability to control a wildfire, including existing and new (e.g. developed as part of the credit project) human-created pre-suppression features (e.g. green strips). Any human-created feature that impacts the reserve account contribution must be maintained throughout the term of the project, and described in the site's Management Plan.

The ability to control wildfire is determined using the area and site-level assessment checklist developed by the Sagebrush Ecosystem Program with contributions from other State of Nevada and Federal agency staff.[13] The assessment evaluates common risk factors (i.e. fuels, topography, ease of access, and distance from initial attack fire-fighting resources) that hinder or improve the ability of firefighting resources to control a wildfire under typical summer weather conditions for the project site. The assessment includes evaluation of the effectiveness of existing fire suppression features on the landscape, as well as the effectiveness of fire suppression features implemented as part of the credit project. Table 14 provides the reserve account contribution percentage based on the assessment score for the credit project site.

Table 14: Ability to Control reserve account categories and contribution percentages

Assessment Category	Contribution Percentage
High	*TBD*
Moderate	*TBD*
Low	*TBD*

Probability of Competing Land Uses

In addition to the base reserve account contribution, a portion of each transfer of credits to a Credit Buyer's account is contributed into the reserve account to be available to temporarily cover credits invalided by competing land uses. The Credit System determines the probability of competing land uses based on credit site ownership, the application of land protection mechanisms on the credit site and other characteristics of the credit project.

Different land protection mechanisms are available on privately- and publicly-owned land, and other unique characteristics of privately- and publicly-owned land influence the probability of completing land uses invaliding credit sites. Table 15 and Table 16 identify different credit site characteristics related to the probability of completing land uses invalidating credits for private- and publicly-owned lands, respectively. Note that each credit site must meet minimum site eligibility requirements, including proof of no imminent threat of direct or indirect disturbance to the credit site. See the *Section 2.3.3: Credit Site Eligibility* for additional information.

Important credit site characteristics related to the probability of competing land uses are expected to arise that do not justify a different contribution percentage than defined by the tables below. In these cases, the Credit Developer and Administrator will address issues as they arise on a case-by-case basis. Further, federal agencies are currently working on guidance related to durability on public lands - Table 16 is expected to be updated once this guidance becomes available.

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[13] As of December 4, 2014, the assessment checklist is currently under development by the SEP.

Table 15: Competing Land Uses reserve account categories and contribution percentages for credits on privately-owned land

Minimum Competing Land Use Related Requirements	**Contribution Percentage**
Participant Contract and Conservation Easement and Ownership of Subsurface Rights	0%
Participant Contract and Conservation Easement	1%
Participant Contract and Ownership of Subsurface Rights	3%
Participant Contract	4%

Table 16: Competing Land Uses reserve account categories and contribution percentages for credits on publicly-owned land

Minimum Competing Land Use Related Requirements*	**Contribution Percentage**
Participant Contract and Public Land Authorization and Located within BLM Priority Habitat Management Area and Other Authorizations on the Site Prohibited*	0%
Participant Contract and Public Land Authorization and (Located within BLM Priority Habitat Management Area or (Located within BLM General Habitat Management Area and No Existing Authorizations on the Site under Other Ownership**))	2%
Participant Contract and Public Land Authorization	4%

*Other authorizations may be prohibited due to the Credit Developers authorization (e.g. Easement) and protection described in the associated NEPA decision or special land use designations (e.g. Area of Critical of Environmental Concern (ACEC)).

**Existing authorizations include mining claims, oil and gas leases, and grazing leases. Note that other authorizations (e.g. grazing lease) owned by the Credit Developers comply with this requirement since the Credit Developer has control of the other authorizations effect on the credit site achieving the performance standard.

Credit Developers must provide evidence that minimum competing land use related requirements have been fulfilled. For example, public land authorizations and relevant existing authorizations owned by the Credit Developer must be attachments to the Management Plan.

2.4.4 CREDIT RELEASE

The Credit System uses credit release schedules to manage risk and uncertainty by releasing credits only when specific performance standards are met. Credit releases occur when a new milestone of performance standards, in terms of habitat function, is achieved on the credit site that warrants an increase in the amount of credit generated on that project site. Credit releases require third-party verification, defined in *Section 2.4.5: Credit Site Verification*. Specific performance standards are defined in each credit project's Management Plan, and each credit project will have a unique credit release schedule based on those performance standards. A credit release schedule is different than credit payment schedules described in *Section 2.4.6 Financial Assurances*.

If a credit project is unable to achieve performance standards defined in the credit project's Management Plan in order to release credits, the Credit Developer will work with the Administrator to adjust the performance standards and release schedule. A decline in habitat function outside of the tolerances defined in *Section 2.4.5: Credit Site Verification* after credits are released will require the credit site to be remedied, or the credit site's financial assurances may be used to replace the invalidated credits. See *Section 2.4.6: Financial Assurances* for additional information on financial assurances.

Stewardship Management Actions

For credit projects based on stewardship management actions, credit release occurs when a habitat function performance standard defined in the credit project's Management Plan is achieved. Credit projects based on stewardship management actions cannot include performance standards defined by management actions, but rather only performance standards defined by habitat function. Credit projects that primarily maintain pre-project habitat function are likely to have a single credit release. If a credit project based on stewardship management actions includes multiple credit releases, the portion of credits released at each milestone must be less than or equal to the percent increase in habitat function relative to the total increase in habitat function expected to be achieved by the project. A credit release schedule associated with specific performance standards in the credit project's Management Plan can include multiple credit release intervals; however each release must require at least a 5% increase in site-scale habitat function. Credits are released at the point when a third-party verifies an achieved performance standard. Credits released are valid for the full duration of the project's life, provided that the Credit Developer continues to meet that performance standard as confirmed by third-party verification and self-monitoring reports. Verification requirements are defined in *Section 2.4.5: Credit Site Verification*.

Restoration Management Actions

For credit projects containing restoration management actions and habitat quality is anticipated to significantly improve over the life of the project, credit releases occur when a performance standard defined in the project's Management Plan is achieved. Credit projects containing restoration management actions can include performance standards defined by management actions and habitat function, as described in the bullets below. Credits are released at the point that a third-party verifies an achieved performance standard. A credit release schedule associated to a performance standard in the credit project's Management Plan can include multiple credit release intervals; however each credit release defined by habitat function must require at least a 5% increase in site scale habitat function. Credit release does not necessarily follow the same schedule as the payment structure for Credit Developers described in *Section 2.4.6 Financial Assurances*.

- Up to, but no more than the first **one third** of credits may be released upon implementation of management actions defined in the project's Management Plan. Credits released based on fulfilling management action criteria are limited to **one third** of the total credits that the project is ultimately anticipated to generate and the portion must be agreed to by the Administrator. For example, a credit project site with the potential to generate 600 credits, only 200 credits, may be released upon implementation of specified management actions.
- The remaining **two thirds** or more of credits are released over additional credit release intervals upon verification that the habitat quality is meeting the performance standards. The portion of credits released at each milestone must be less than or equal to the percent increase in habitat function relative to the total increase in habitat function expected to be achieved by the project.

Table 17 below illustrates an example credit release scheduled with one third of credits released based on management actions, and the remaining two thirds released in two additional credit releases. Upon verifying conditions to release all credits anticipated by the credit project, all credits are expected to be maintained for the full duration of the project's life, according to the performance standards defined in the Management Plan and confirmed in verification and self-monitoring reports.

Table 17: Example Credit Release Schedule for a Restoration Project

Performance criteria achieved	Credits Released
Milestone 1: Management Actions - Restore riparian area - 1/3 of performance assurances secured	**33%** of Total Anticipated Credits
Milestone 2: Habitat Function Performance - 66% of expected HQT score for the project - 2/3 of performance assurances secured	**66%** of Total Anticipated Credits
Milestone 3: Habitat Function Performance - 100% of expected HQT score for the project - All performance assurances secured	**100%** of Total Anticipated Credits

The Credit System ensures net benefit for greater sage-grouse and limits overall program risk by limiting management action-based credit releases to up to one third of the anticipated credits and using a combination of additional mechanisms, including mitigation ratios, the reserve account, and financial assurances. Should a restoration project fail to generate the credits indicated in the credit site's Management Plan, this combination of mechanisms covers any shortfalls in credits.

Although restoration projects may carry some risk of not achieving projected outcomes, it is important for the long-term viability of the species that habitat is restored to improved functionality, and therefore important that Credit Developers are incentivized to undertake these types of projects. A credit release upon implementation of management actions, along with the credit baseline function for restoration projects defined in *Section 2.3.4: Calculating Credit Baseline Habitat Function*, helps to enable restoration activities to be more economically viable.

2.4.5 CREDIT SITE VERIFICATION

All credit projects require verification prior to the release of any portion of the anticipated credits generated from projects, and throughout the duration of each credit project. See *Section 2.4.4: Credit Release* for additional information on credit release requirements and schedules.

The purpose of verification for credit projects is to provide confidence to all participants, including the Administrator, that credit calculations represent a true and accurate account of on-the-ground implementation actions and habitat function, as defined in each project's Management Plan. In addition, ongoing verification and monitoring ensures that projects are maintained over time and support the expected habitat quality commensurate with the amount of credits generated. Ongoing verification also confirms whether activities on adjacent project sites have occurred that compromise the ability of enrolled credit sites to generate credits according to their Management Plan. The required frequency and process for verification, and Verifier selection is described below.

Verification of the HQT functional acre calculations and other criteria defined in the Management Plan is required prior to a credit release and periodically throughout the duration of the project. These verifications are conducted using the HQT and review of the Management Plan by third-party Verifiers who are trained and certified by the Administrator. Credit Developers are also required to conduct and report on annual self-monitoring, as defined in each Management Plan.

Credit Verification Schedule

The verification schedule for a credit project is based on the credit release schedule defined in each Management Plan, and incorporates the following requirements:

1. Before first credit release (Verifier)
2. Before additional credit releases (Verifier)
3. At least every 5th year (Verifier)

4. Periodic spot checks and audits (Administrator or relevant public land management agency)
5. Annual self-monitoring (Credit Developer)

Before first credit release

Third-party verification is required and the Administrator reviews the verification report as a necessary component of the documentation before the first credit release is approved.

Before additional credit releases

Third-party verification is required to confirm that conditions meet the performance standard specified in the credit release schedule in a project's Management Plan before a release of additional credits.

At least every 5th year

At least every fifth year, a third-party verification is conducted and all documentation (i.e. current conditions data, HQT outputs, and final credit calculations) is reviewed by the Administrator to evaluate the project based on performance standards included in the Management Plan. When verification is conducted to either support an increase in credit amount or for a periodic spot check and audit, the verification required every five years is reset. Thus, if project verification is completed in year 3 to support a new credit release, then the next verification is not required until year 8.

Periodic spot checks and audits

The Administrator or relevant public land management agency for credit projects on public lands conduct random audits of approximately 5-10% of credit sites in any particular year.

Self-monitoring

Credit Developers are expected to conduct self-monitoring annually to ensure that the site is meeting defined performance standards and to report results to the Administrator.

Credit Variability & Verification Results

Credit variability is variation in habitat function on a site as measured by the HQT at two different points in time. Even on relatively stable sites, variability is likely to result due to variation in climatic conditions and other natural events that influence habitat function. Credit variability is also likely to occur due to sampling error that is inherent to any measurement method. Based on these considerations, the Credit System allows for limited variability in habitat function as a mechanism to insulate Credit Developers from being subject to penalties for minor fluctuations in habitat quality.

Upon each credit release, third-party verification must substantiate that the site meets or exceeds the habitat function defined in the credit release schedule of the project's Management Plan. Subsequent verifications may be no more than an appropriate site-specific percentage below the site-scale habitat function performance standard as determined using the HQT. The appropriate percentage, or credit variability tolerance, must be approved by the Administrator and documented in the Management Plan prior to the first credit release. Credit project verifications within the credit variability tolerance are considered as meeting performance standards defined in the Management Plan, and therefore do not require a reduction in credits, or trigger the use of Financial Assurances for the site.

If verification shows that a credit site is performing below the credit variability tolerance and is therefore not meeting performance standards, the Credit Developer must work with the Administrator to determine a remedial action plan. Credit projects outside of the credit variability tolerance may be subject to the Credit System's processes related to credit reversals. See *Section 2.1.7: Reserve Account Management and Use of Financial Assurances* for more information on how credit reversals are addressed.

Verifier Selection

Contracting and payment for verification of credit projects is handled by the Administrator. The Credit Developer does not directly hire a Verifier. The Administrator receives a verification fee and a signed verification contract to allow access to the site from the Credit Developer. The Administrator selects from the pool of certified Verifiers, and notifies the Credit Developer before the Verifier conducts a site visit. Verifications conducted as periodic spot checks and audits are funded by the Administrator.

2.4.6 FINANCIAL ASSURANCES

The Credit System requires that Credit Developers establish appropriate financial assurances for each credit project site in order to sell credits. Financial assurances are fiscal mechanisms that are used to ensure the durability of credits generated throughout the full duration of a credit project. Financial assurances are defined in each Credit Developer's Participant Contract and documented in an accompanying Management Plan, and can consist of contract terms, such as financial penalties for intentional reversals and specific payment terms, and financial instruments, such as long-term stewardship funds and contract surety bonds. Financial assurances must ensure that funds are available:

1) For the implementation and long-term management of each credit project, including remedial actions in the event of unintentional reversals, and
2) To promptly replace credits that have been sold but become invalidated due to intentional reversals.

The Administrator and Credit Developer will define a financial assurance package that is acceptable to both the Administrator and Credit Developer. The specific financial assurances package can be a combination of one or various mechanisms (e.g., long-term stewardship funds, contract payment terms, contract surety bonds and contract penalties) that ensure sufficient funds are available to meet the above needs. Financial instruments must be held either by the Administrator or a qualified third party institution that is approved by the Administrator.

The following overarching principles and basic minimum requirements guide the development of financial assurance packages:

- Minimize financial transaction costs and maximize payments to Credit Developers for actions that improve habitat;
- Appropriately allocate risk to Credit Developers and not solely to the Administrator;
- Preferably use mechanisms that do not require the Administrator to engage in costly litigation with Credit Developers to secure funds for credit replacement;
- Include provisions that hold to the principal that projects will not receive any future payments for projects that are not producing credits, even in the case of force majeure if a credit project has been deemed inappropriate to remediate;
- Design financial instruments to cover long-term management of credit project sites and replacement of credit reversals, considering:
  - Management and maintenance activities defined in Management Plan
  - Monitoring and verification defined in Management Plan
  - Appropriate fund management and rate of return
  - Relevant inflation rates
  - Credit market price trends

Financial Assurances for Long-term Credit Site Management, Monitoring, and Unintentional Reversals

Financial assurances are required for the long-term management and monitoring of all credit projects. Financial assurances established for long-term management and monitoring must be designed to meet the following requirements:

- Cover all anticipated costs expected to perform maintenance and monitoring of the project as defined in the Management Plan for the duration of the contract;
- Ensure contingency funds are available to address periodic project-related costs that are likely to occur; and

- Ensure an ongoing financial incentive that is greater than the anticipated cost to maintain and monitor the project.

Financial instruments may be secured to ensure long-term credit site management, monitoring, and remedial actions in the event of unintentional reversals. If used, the type of financial instrument required is dependent on the duration of the credit project. Permanent credit projects require a long-term financial instrument for which the principal amount is managed in perpetuity. Term credit projects require a financial instrument that is managed such that no funds remain at the end of the credit project.

Financial instruments established for long-term management and monitoring must use an initial deposit amount that factors in annual payments intended for the Credit Developer and accounts for inflation, as well as expected financial returns from appropriately investing funds for long-term management and monitoring. Annual payments may be structured to provide variable annual amounts when additional costs are expected in specific years or on years when third-party verification is performed and the credit site is shown to perform at, or above, expected performance. Variable payments must be structured such that the financial instrument is sufficient to make all defined payments for the full duration of the project. The Administrator must agree that the initial deposit amount for each credit project will cover the necessary annual payments using a predictive financial model that accounts for inflation and interest rates.

Financial instruments established for long-term management and monitoring must be accompanied by contract terms that ensure funds intended for the Credit Developer are available to the Administrator in the case of an unintentional reversal, so that all remaining funds for long-term management and monitoring can be used to remediate the credit site or to purchase credits from a different site, as defined in *Section 2.1.7: Reserve Account Management and Use of Financial Assurances*. These payment terms align the incentives of the Credit Developer and the Administrator by sharing the financial risk for ongoing performance.

In situations where credit projects do not require long-term management and monitoring funds, or a large upfront payment is made to the Credit Developer, such as for restoration projects, other financial instruments, such as a contract surety bond, may be used to ensure sufficient funds are available to the Administrator in the case of unintentional reversals.

Financial Assurances for Intentional Reversals

Financial assurances must be established to ensure the Administrator has access to funds at the level required to replace credits sold but that have become invalidated due to intentional reversals. Financial assurances established for intentional reversals must be designed to meet the following requirements:

- Cover the monetary costs of acquiring new credits to replace all invalidated credits; and
- Ensure that the additional effort incurred by the Administrator to secure new credits is fully funded.

Financial assurances that can fulfill the intentional reversals requirement include contract terms, such as financial penalties, and financial instruments, such as contract surety bonds. Contract terms must define that if performance standards on a credit project site are not met, the financial assurances used to fulfill the intentional reversal requirement as well as remaining funds in that project's financial assurances for long-term management and monitoring are available to the Administrator. See *Section 2.1.7: Reserve Account Management and Use of Financial Assurances* for additional information on how the Administrator will use the reserve account and financial assurances in the case of intentional reversals.

2.5 CREDIT OBLIGATION PROVISIONS & CREDIT INVESTMENT STRATEGIES

This section describes credit obligation provisions for debit projects to ensure credit obligations offset the direct and indirect impacts of debit projects. Credit obligation provisions include debit project duration and verification requirements. In addition, this section describes investment strategies that debit projects and other Credit Buyers can be used to acquire credits, depending on the goal of the acquisition. Credit Buyers are the primary audience of this section.

2.5.1 DEBIT SERVICE AREA

The Credit System service area is the mapped geographic region where credits are required to offset debits that occur when disturbances are proven unavoidable, and minimization does not provide for complete direct or indirect impact avoidance.[14] Debits on public lands within the service area will be tracked and reported by the Credit System. The service area designation has important implications for the viability of the Credit System transactions and for the ability of the System to generate a net benefit for greater sage-grouse habitat from the impacts from anthropogenic disturbances.

The current SGMA is the Credit System service area, and the 2014 SGMA map is provided in Figure 17 as an example. The boundaries of this management area are based on the range of the species in the State of Nevada and are aligned with State of Nevada development project review requirements. Anthropogenic disturbances to habitat on BLM, USFS, State of Nevada, and local government lands within the service area require consultation with the SETT and the appropriate government agency, as defined in the 2014 Nevada Greater Sage-Grouse Conservation Plan.

Figure 17: Greater sage-grouse service area

While the Service Area broadly defines the domain of the Credit System, the Mitigation Ratios establish incentivizes to offset debits using credits generated in close proximity to debit sites. *Section 2.2.2: Mitigation and Proximity Ratios* describes how the WAFWA Management Zones and the NDOW PMUs, depicted in the Figure 12 and Figure 13**Error! Reference source not found.** respectively, are incorporated into the proximity ratio. In addition, three Management Categories are also incorporated into the Mitigation Ratios to encourage the generation of credits and discourage debits in Core and Priority Management Areas, which are estimated to have high space-use by greater sage-grouse. Credits and debits will be tracked in the Credit System Registry and reported by the Administrator by WAFWA Zones and PMUs.

2.5.2 DEBIT PROJECT TYPES

Proposed anthropogenic disturbances to habitat on BLM, USFS, State of Nevada and local government lands within the SGMA require consultation with the SETT and the appropriate government agency, as defined in the 2014 Nevada Greater Sage-Grouse Conservation Plan. Anthropogenic disturbances are considered debit projects when they are proven to be unavoidable, and when minimization does not

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[14] US Fish and Wildlife Service. Greater Sage-Grouse Range-Wide Mitigation Framework Version 1.0. September 3, 2014. Page 6.

provide for complete direct or indirect impact avoidance[15]. A debit project may be a new anthropogenic disturbance, an expansion in the operation of an existing anthropogenic disturbance, or an extension in duration of an existing anthropogenic disturbance.

As defined in the 2014 Nevada Greater Sage-Grouse Conservation Plan, an anthropogenic disturbance is defined as any human-caused activity or action or human-created physical structures that may have adverse impacts on greater sage-grouse or their habitat. Anthropogenic disturbance project categories include:

- Mineral development and exploration and its associated infrastructure;
- Renewable and nonrenewable energy production, transmission, and distribution and its associated infrastructure;
- Paved and unpaved roads and highways;
- Cell phone towers;
- Landfills;
- Pipelines;
- Residential and commercial subdivisions;
- Activities undertaken pursuant to special use permits and right-of-way grants; and
- Other infrastructure development.

Livestock operations and agricultural activities and infrastructure related to ranch and farm businesses (e.g. water troughs, fences, etc.) are not included in this definition of debit project types. Section 7.5 and Appendix A of the 2014 Nevada Greater Sage-Grouse Conservation Plan address how to minimize impacts to greater sage-grouse and their habitat from these activities.

2.5.3 MITIGATION HIERARCHY AND PERMIT REQUIREMENTS

The Credit System is intended to be used in the context of state and federal policies that require the full mitigation hierarchy sequence (e.g. avoidance, minimization, compensatory mitigation). Credits are used to offset debits that occur when disturbances are proven unavoidable, and minimization does not provide for complete direct or indirect impact avoidance.[16] Debit projects permitted through federal and state agencies will use the Credit System to purchase credits that fulfill their compensatory mitigation obligations prior to development of the debit project.[17]

2014 Nevada Greater Sage-Grouse Conservation Plan

The State of Nevada's overriding policy for all management actions within the Sage-grouse Management Area is to "avoid, minimize, and mitigate" impacts to sage-grouse habitat.

Credit Buyers can acquire verified credits directly from Credit Developers, including Aggregators, or the Administrator who may carry an inventory of Credits to facilitate offset transactions. Credits cannot be acquired from Credit Developers or the Administrator until credits are released by the Administrator, which requires verification that habitat function is meeting the defined performance criteria for the credit project. Credit Buyers may use alternative investment mechanisms to acquire credits, such as reverse auctions that leverage competitive bidding processes to procure the greatest amount of credits for a set

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[15] US Fish and Wildlife Service. Greater Sage-Grouse Range-Wide Mitigation Framework Version 1.0. September 3, 2014. Page 6.

[16] US Fish and Wildlife Service. Greater Sage-Grouse Range-Wide Mitigation Framework Version 1.0. September 3, 2014. Page 6.

[17] As of December 4, 2014, debit projects permitted through federal agencies are not required to use the Credit System to fulfill their compensatory mitigation obligations. However, the Credit System is expected to be included in the BLM/USFS Land Use Plans for the Northeastern California-Nevada Sub Region as the tool for defining and fulfilling compensatory mitigation requirements for anthropogenic disturbances to greater sage-grouse habitat on BLM and USFS lands in the State of Nevada.

amount of funding. The Credit Buyer pays the full cost of acquiring credits including all necessary administrative fees.

Those Credit Buyers who purchase credits to fulfill regulatory requirements for compensatory mitigation are responsible for meeting all requirements of the relevant permitting process through the State of Nevada, BLM, or other government agencies. Credit Buyers must provide documentation of the permit stipulations and debit project design documents to the Administrator to ensure proper identification of the total amount of credits needed to offset the debit project, and the total duration of the debit project. This allows the Administrator to 1) ensure that the debit project is appropriately offset with a credit project and 2) transparently track and report on all credit transactions and programmatic net benefit generated. See *Section 2.2: Habitat Quantification and Credit and Debit Calculation* for additional information on calculating credit obligations and *Section 2.5.4: Debit Project Duration* for additional information on project duration provisions.

2.5.4 DEBIT PROJECT DURATION

Debit project duration is the length of time that the project is anticipated to impact habitat function or in perpetuity. For impacts that are anticipated to return to pre-project habitat function, an additional set period of time beyond the length of time that the project is anticipated to impact habitat function is required to allow the species to begin to use the site. The stated duration in the permit or lease for each anthropogenic disturbance plus an additional 10 years will be used as a starting point for establishing the debit project duration for impacts with limited term impacts..

Like credit projects, the duration of debit projects can be either limited term or in perpetuity. Debit projects that are not expected to return to pre-project habitat function have an in perpetuity project duration. *Rehabilitation* necessary to return a debit site to pre-project habitat function will be defined in the permit or lease for the anthropogenic disturbance in order for the Administrator to agree to the debit project duration.

Debit projects may include areas within the project boundary that are expected to return to pre-project habitat function and other areas that are not expected to return to pre-project habitat function. Further, debit may include areas that are impacted for longer durations than others. For example, habitat indirectly impacted by a debit project is likely to return to pre-project habitat function with minimal rehabilitation such as removal of roads and structures. However, habitat directly impacted by a debit project such as an open-pit mine are not expected to return to pre-project habitat function. Therefore, debit projects may generate debits with different project durations, including different term periods and a mix of term and in perpetuity.

For term debits, third-party verification is required to demonstrate that the habitat impacted by the debits has returned to pre-project habitat function. See *Section 2.5.6: Debit Site Verification* additional information on verification requirements. If verification demonstrates that a term debit project has not yet been fully rehabilitated, the Administrator will require additional credits sufficient to cover the residual impact be purchased for an additional term.

Matching the Duration of Credits and Debits

The Credit System requires the duration of a contracted credit project to be equal to, or greater than, the duration of the debit project it is offsetting. The Administrator ensures that credit project durations are sufficient to meet or exceed the duration of the debit project they are offsetting through *static offsets* or *dynamic offsets*.

- **Static Offsets –** A debit project is offset by a credit project that is fixed in a single geographic location with the Participant Contract, Management Plan and associated site protection mechanisms in place for the contracted duration of the debit project.

- **Dynamic Offsets –** A debit project is offset by a series of limited term credit projects such that the location of the credit projects can shift across a defined geographic space (i.e. a set of rolling term projects funded for the full duration of the debit project). Dynamic offsets are defined as a series of strategically located, limited term-based agreements that, when sequentially aggregated, meet or exceed the duration of the impact.

Requirements for Dynamic Offsets

A Credit Developer, Aggregator or the Administrator may develop a dynamic offset arrangement that commits to meet the credit requirements for a debit project using a series of limited term credit projects. The series of limited term credit projects under a dynamic offset arrangement must cover the credit obligation of the debit project for each year of the debit project. For example, if the credit obligation of a debit project is 1,000 credits into perpetuity, then the limited term credit projects must provide 1,000 credits for each year into perpetuity. The limited term credit projects cannot provide 3,000 credits for the first 30 years and 0 credits for the next 60 years.

In addition, each limited term credit project under a dynamic offset arrangement must have duration of at least 30 years because the debit project is permanent and rapidly changing habitat function (credit sites) can be detrimental to populations.

The financial assurances associated with a dynamic offset credit project are similar to those required for static offset projects but include additional requirements to ensure durability and require that finances are in place to secure new limited term contracts for the full length of the impact. Additionally, the Administrator must be able to ensure compliance and accountability through tracking and reporting, enforcement for credit reversals, and direct management of financial instruments. See *Section 2.1.7: Reserve Account and Use of Financial Assurances* for more information.

The potential benefits of dynamic offset projects include increased participation and a greater number of total credit projects and credits available for sale due to Credit Developer preferences for term contracts. Term projects also enable the ability to shift the location of high quality habitat in response to population dynamics and potential effects of climate change.

2.5.5 CALCULATING DEBIT BASELINE HABITAT FUNCTION

Debit baseline habitat function is the starting point from which functional acre loss is measured. Functional acre loss is then multiplied by a mitigation ratio to determine the debits generated for each map unit within a debit project. See *Section 2.2.2: Mitigation and Proximity Ratios* for additional information on determining mitigation ratios. Functional acre loss represents the functional acre change from debit baseline functional acres that results from implementing a project. Functional acre loss is equal to the difference between the post-project functional acres and the pre-project functional acres.

Debit baseline habitat function is the pre-project habitat function of each map unit within the debit site, and is calculated by multiplying

- Local-scale, pre-project habitat function as determined by the HQT, and
- Site-scale, pre-project habitat function as determined by the HQT.

See *Section 2.2.1: Habitat Quantification Tool* for description of scales.

An example debit baseline habitat function is illustrated in Table 18 for a map unit with high local-scale and moderate site-scale pre-project habitat function.

Table 18: Example debit baseline calculation

Local-scale Pre-Project Habitat Function	Site-scale Pre-Project Habitat Function	Debit Baseline Habitat Function

80%	40%	32%

Pre-project habitat functional-acres calculated must be verified by a third-party Verifier before any development on the site can begin. See *Section 2.5.6: Debit Site Verification* for additional information on verification requirements.

Recent Wildfire

Vegetation characteristics required to calculate site-scale habitat function by the HQT are unlikely to reflect the future habitat function on the site if wildfire has impacted a debit site recently. If wildfire has impacted a debit site within the last 10 years, site-scale habitat function is calculated using the greater of the following for the portion of the project area impacted by wildfire to calculate debit baseline:

1) Site-scale pre-project habitat function as determined by the HQT.
2) Site-scale regional standard habitat function as defined in Table 11 plus 10%.

Inaccessible Areas

For some debit projects, the Credit Buyer will not be able to calculate the site-scale pre-project habitat function for a portion of the area indirectly impacted by the debit project. For example, the debit project may indirectly impact a private party for which the Credit Buyer is not able to secure access to in order to collect field data necessary to calculate site-scale habitat function using the HQT. In these situations, the Habitat Suitability Index (HSI) score, as measured by the HQT as part of the local-scale habitat function calculation, is used as a proxy for the site-scale habitat function for the inaccessible areas. The HSI is spatially explicit and easily available for any site within SGMA.

2.5.6 DEBIT SITE VERIFICATION

All debit projects require verification prior to beginning the development of the debit project and throughout the entire duration of each debit project. The purpose of verification for debit projects is to provide confidence to all participants, including the Administrator, that debit calculations represent a true and accurate account of on-the-ground habitat function, as defined in each debit project's regulatory permit. Ongoing verification and monitoring ensures that debit projects are implemented and impacts cease as defined in the project's permit. The required frequency and process for verification, as well as the process for verification selection, is described below.

Verification of debit projects is an independent, expert check on the HQT calculations and other project design documentation. Verifications are conducted using the HQT by third-party Verifiers trained and certified by the Administrator. Verification includes a review of changes to the site over the previous 10 years to ensure that the site was not been recently degraded intentionally to reduce the credit obligation

Biological Monitoring

Biological monitoring is an essential element of the Credit System, and is a separate but complementary process to verification. Biological monitoring is executed through the Credit System's adaptive management process as described in *Section 3.3: Managing the Credit System*. While verification confirms on-site performance in relation to a Management Plan and HQT score, biological monitoring means observing, recording and assessing the quantity and quality of all credit-producing activities, as well as the biological response of greater sage-grouse and critical habitats across the Credit System service area. The goals of biological monitoring under the Credit System are to:

- Assess the status and trend of greater sage-grouse populations
- Assess the net contribution of conservation management outcomes to greater sage-grouse habitat and population goals at a variety of spatial scales
- Assess the effectiveness of management actions in regard to achieving expected habitat outcomes
- Collect and incorporate new information for adaptive management
- Detect and address changed or unforeseen circumstances (e.g. shifts in species distribution)

of the current permit application.

Debit Verification Schedule

Debits under the Credit System are verified at four distinct points in time:

1. Before debit project begins (Verifier)
2. During the project implementation period (Verifier)
3. When debits end or decrease (Verifier)
4. Periodic spot checks and audits (Administrator or relevant public land management agency)

Before debit project begins

Third-party verification of the pre-project condition of greater sage-grouse habitat on debit sites is required before development of debit projects can begin.

During project implementation period

Third-party verification is necessary to verify site conditions after a debit project has been implemented to confirm that the appropriate amount of debit is being attributed to the debit project. Verification during this period is aligned with project design documentation and permit and regulatory requirements.

When term debits end or reduce

Third party verification is necessary at the end of a term debit to confirm that the term debit site is no longer impacting habitat function. If, at the end of the debit project's duration, the site has not been rehabilitated to recover habitat function and allow for species use, the Credit Buyer will be required to purchase additional credits for an additional term. If third-party verification demonstrates a reduction in the impact and amount of credits needed as an offset, the Credit Buyer may sell and transfer surplus credits to another Credit Buyer's account to fulfill their credit obligation in accordance to Credit System requirements defined in *Step D5.2: Sell and Transfer Credits in Section 3*.

Periodic spot checks and audits

The Administrator or relevant public land management agency conducts random audits of approximately 10% of debit sites in any particular year.

Verifier Selection

Contracting and payment for verification of debit projects is handled by the Administrator. The Credit Buyer does not directly hire a Verifier. The Administrator receives a verification fee and a signed verification contract to allow access to the site from the Credit Buyer. The Administrator selects from the pool of certified Verifiers, and notifies the Credit Buyer before the Verifier conducts a site visit. Verifications conducted as periodic spot checks and audits are funded by the Administrator.

2.5.7 CREDIT INVESTMENT STRATEGIES

Credit Buyers have the flexibility to acquire credits in whatever way best meets their credit investment goals, within the bounds and requirements of the Credit System. Credit Buyers can create financial agreements and contracts to secure desired credits with Credit Developers, including Aggregators, completely independent of Administrator oversight. However, financial agreements must provide for financial assurances to be appropriately accessible to the Administrator in the case of reversals, and must include provisions for all administrative fees and contract terms required by the Credit System. Further, all credits and debits generated under the Credit System must be quantified, verified and managed according to Credit System requirements, giving appropriate access and authorities to the Administrator and other designated parties.

Different mechanisms can be used to acquire credits, depending on the goal of the acquisition. The goal of acquisitions ranges from acquiring credits for future sales to acquiring credits for a specific debit project.

Table 19 describes a few of these potential investment approaches, but is not intended to be an exhaustive list.

Table 19: Potential investment strategies

Investment Strategy	Description	Benefits	Typical Uses
Reverse Auction or Requests for Proposal	Bids are solicited for credits or projects that meet defined criteria; Credit Developers submit applications specifying price to deliver a defined quantity of credits	Efficient mechanism to procure the most habitat benefit (credits) for a set amount of funding	▪ Investing set pools of funding ▪ Fulfill credit obligations
Direct Credit Purchase	Credit Buyers purchase verified credits directly from the Credit System Registry	Limits risk for Credit Buyer –credits already verified	▪ High impact investing ▪ Fulfill credit obligations
Select from Potential Project List	Select project from a list of eligible projects that have not yet been implemented that are expected to meet Credit Buyer criteria; Credit Developers estimate expected number of credits	Credit Buyers have quantified information to inform project selection	▪ Conservation funding programs ▪ Fulfill future credit obligations

SECTION 3: CREDIT SYSTEM OPERATIONS

This section defines the Nevada Conservation Credit System (Credit System) Operations, along with associated tools, forms, and templates used to quantify, track, transfer, and report on habitat credit generated through the Credit System. The Credit System Operations are described in the three sections described in Table 20:

Table 20: Overview of the Credit System Operations Sections

Section Name	Primary Audience	Description
Section 3.1: Generating Credits	Credit Developers	Steps for estimating and verifying quantified credits from an individual credit site, including fulfilling ongoing verification requirements. These steps are primarily implemented by Credit Developers and thus are labeled **D1 through D5**.
Section 3.2: Acquiring Credits	Credit Buyers	Steps to obtain credits and use them to meet mitigation requirements and report on accomplishments. These steps are primarily implemented by Credit Buyers and thus are labeled **B1 through B3**.
Section 3.3: Managing the Credit System	Credit System Administrator	Steps to systematically evaluate new information, report results, and improve Credit System operations. These steps are primarily implemented by Administrators and thus are labeled **A1 through A6**.

The following legend is used throughout this section to indicate process steps:

- "**D**" indicates steps taken to develop credits
- "**B**" indicates steps taken to buy credits
- "**A**" indicates steps taken to administer and manage the Credit System over time

SECTION 3.1: GENERATING CREDITS

QUESTIONS ANSWERED

- How does a Credit Developer estimate expected credits from planned management actions?
- How are monitoring and verification results used to determine the amount of credit issued?
- How does a Credit Developer and the Credit System Administrator resolve issues and questions, and agree to final credit estimates and release schedules?

This section describes the process of turning management actions into verified credits. It begins by selecting a site and determining eligibility to generate credits, estimating credits from projected actions, and verifying that on-the-ground conditions are consistent with the submitted credit estimates. Credits are then issued, tracked and transferred between Credit Developer and Credit Buyer accounts. After transfer, the Credit Developer is responsible for meeting the monitoring, reporting and verification requirements of each project for the life of the project (described in *Step D3*). Figure 18 and Table 21 provide an overview of the steps of credit generation and the different participants engaged at each step.

Figure 18: Credit Generation Overview

Effective credit projects result in improved habitat and environmental conditions. Effectiveness depends both on implementing a quality project design and ensuring the project site is maintained to produce the expected environmental outcomes. Steps D1 and D2 define the process for estimating the number of credits generated from implementing the credit project. Step D3 defines the process to verify that actual on-the-ground conditions support the expected credits over time. Steps D4 and D5 describe how credits are issued, tracked and transferred.

Table 21: Overview of Roles, Tools & Products to Estimate, Verify, Issue and Track Credits from Projects

Process Step	Credit Developer[18]	Administrator	Buyer	Relevant Tools, Forms & Templates	Completed Products
D1. Select & Validate Site	■	■	□	▪ Validation Checklist	▪ List of Credit Opportunities ▪ Notice of Validation
D2. Calculate Credit & Implement Project	■	■		▪ Habitat Quantification Tool (HQT) & Associated Forms ▪ Management Plan ▪ Participant Contract ▪ Verification Contract	▪ Pre-project Draft Management Plan ▪ Final Management Plan ▪ Proof of Construction Period ▪ Financial Assurances
D3. Verify Conditions	■	■		▪ Conflict of Interest Form	▪ Verification Report ▪ Self-Monitoring Report
D4. Register & Issue	■	■		▪ n/a	▪ Registry Account ▪ Registered Project ▪ Issued Credits
D5. Track & Transfer Credits	■	■	■	▪ Notice of Transfer Form	▪ Accomplishments Report

■ Indicates a necessary or active role
□ Indicates potential participation or a support role

D1 SELECT & VALIDATE PROJECT SITE

Figure 19: Select & Validate Project Site

In this step, the Credit Developer identifies a project site that is likely to produce credits and the Administrator validates that the site is eligible to produce credits through the Credit System.

D1.1 INDICATE INITIAL INTEREST & INITIATE COMMUNICATION

This first step for the Credit Developer is to become aware of the opportunity to participate in the Credit System. The Credit Developer is introduced to the Credit System through outreach, communication materials or word of mouth, and learns about the potential benefits of participating. The Credit Developer or the Credit Developer's representative makes contact with the Administrator by email or phone to provide basic information, such as name, area of interest, and contact information. The Administrator provides a list of Technical Support Providers in the project area to assist with project design, credit quantification, and project implementation.

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[18] Any reference to steps undertaken by Credit Developers may actually be implemented by Technical Support Providers or aggregators.

D1.2 SELECT PROJECT SITE

The Credit Developer should consider potential conservation opportunities, the likelihood that a project will deliver significant sage-grouse habitat benefits, and the potential costs and challenges to implement the project. Technical Support Providers or Aggregators can help provide advice to Credit Developers on these considerations.

D1.3 SUBMIT PROJECT VALIDATION CHECKLIST

The Credit Developer completes an eligibility screen, addressing a site's ability to generate credits, and its potential alignment with identified Credit Buyers and funding programs. This step is typically supported by a knowledgeable Technical Support Provider or Aggregator who helps the Credit Developer complete a Validation Checklist. This checklist records the proposed management actions, timeline, and location of a proposed project site. It also confirms certain minimum eligibility criteria, such as basic information related to ownership, site history, and land protection.

Product ■ Completed Validation Checklist

D1.4 VALIDATE & IDENTIFY CONSERVATION OPPORTUNITY

The Administrator reviews the Validation Checklist. If all validation criteria are met, the Administrator coordinates approval from any additional validation leads, such as relevant regulatory agencies, and issues a Notice of Validation to the Credit Developer. The Notice of Validation is a statement that the project is eligible to generate credits if all information provided is accurate and complete. It is not a confirmation of the quantity of credits to be issued. All information and documentation provided in the Validation Checklist is reviewed in greater depth during verification (Step D3).

If validation criteria are not met, the Administrator provides reasons why the project may not be eligible to participate in the Credit System.

The Administrator maintains a list of projects seeking funding for implementation while respecting confidentiality rules outlined by the Credit System and described in *Section 2: Policy and Technical Elements*. The Administrator may include the credit project on its list of credit projects seeking funding on the List of Credit Opportunities, if so desired by the Credit Developer.

Product ■ Notice of Validation

Product ■ List of Credit Opportunities

D2 CALCULATE CREDIT & IMPLEMENT PROJECT

Figure 20: Calculate Credit & Implement Project

Typically, a Technical Support Provider or Aggregator assists the Credit Developer in designing the credit project and estimating the expected credit amount using the HQT. Credit calculation must be done by a person well-versed in the HQT. The Credit Developer has the option to check the design calculations with the Administrator to gain confidence that the initial estimate of credits is accurate. Typically, practical opportunities and constraints that arise during implementation cause actual conditions to differ from design plans. Thus, final calculations must be revised to reflect actual post-project conditions.

Alternatively, the Credit Developer may wait to calculate habitat function until the project is complete, and then perform all calculations using post-project conditions. If this is the desired course of action, care must be taken to thoroughly document pre-project conditions using the HQT. Project proponents are advised to consult with the Administrator before initiating credit project implementation.

D2.1 CALCULATE PRE-PROJECT CONDITIONS

The Credit Developer follows the process defined in the HQT to define the credit project boundaries and calculate the pre-project conditions. Although baseline habitat function for credit projects is based on the site scale, regional standard baseline, calculating pre-project condition is necessary for the Credit Developer to confidently estimate and Administrator to agree to post-project habitat function performance standards. The Credit Developer or Technical Support Provider fills in the pre-project data results from the field inventory, completes any necessary calculations using the HQT, and provides the completed field datasheets to the Administrator.

Product ■ Pre-project HQT Results with Associated Forms

D2.2 DEFINE & SUBMIT PROJECT DESIGN INFORMATION

The Credit Developer completes a pre-project draft Management Plan that defines credit project boundaries and anticipated post-project conditions, based on initial HQT estimates. The Credit Developer can elect to include multiple credit project design scenarios in the pre-project draft Management Plan to estimate and compare the amount of credit generated from different design options. The pre-project draft Management Plan is submitted to the Administrator for pre-approval, prior to the implementation of management practices. These steps are described in further detail below.

Delineate Project Boundaries & Estimate Projected Credits

The Credit Developer follows the process defined in the HQT to define the credit project boundaries and estimate expected post-action conditions[19]. Guidance for selecting the appropriate duration of a credit project is included in the *Section 2.4.2: Credit Project Duration*. Project boundaries, planned management actions, including ongoing maintenance and monitoring, project duration, and expected post-project conditions for the site are documented in the pre-project draft Management Plan.

Product ■ Pre-project Draft Management Plan

Submit Pre-project Draft Management Plan to Administrator for Pre-Approval

The Credit Developer submits the pre-project draft Management Plan to the Administrator for pre-approval before initiating project implementation to gain assurance that the credit calculations are correct given the design assumptions used. The pre-project draft Management Plan may contain multiple project design scenarios, with associated credit calculations. If appropriate and requested by the Credit Developer or a potential Credit Buyer, regulatory entities may also be involved in this pre-approval check to confirm the credit project meets any special requirements necessary for regulatory approval. This optional step provides the Credit Developer with an indication of the amount of credits expected from the project if the conservation measures are implemented as designed.

Product ■ Pre-project Draft Management Plan

Secure Project Implementation Funding (If Applicable)

The Credit Developer secures any necessary funding to implement the project, as needed. For restoration projects, the Administrator may require proof of financial assurances for the construction period. The full

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[19] Note that pre-project and post-project boundaries must be exactly the same to develop an accurate comparison between pre- and post-project conditions. Map units, as defined in the HQT, may change between pre- and post-project calculations.

set of financial assurances is not required until step D2.3 when all materials are submitted to the Administrator to signal readiness for verification.

Product ■ Proof of Construction Period Financial Assurances (if applicable)

D2.3 IMPLEMENT PROJECT, REFINE CALCULATIONS & SUBMIT

Implement Project

The Credit Developer, Technical Support Providers or Aggregator implements the project with the understanding that final credit amounts will be determined using post-project conditions. The ability to adjust calculations based on site design enables the Credit Developer to identify additional opportunities to make improvements during project implementation and enables practical adjustments that may be necessary due to unforeseen site constraints.

Confirm or Refine Credit Calculations

The Credit Developer either confirms that the project was completed consistent with the submitted pre-project draft Management Plan, or includes a new project design scenario that accurately reflects post-project conditions. If post-project conditions differ from design expectations, or if pre-project calculations were not completed, the Credit Developer uses the HQT to calculate the number of credits generated using post- project conditions.

Product ■ Revised draft Management Plan

Refine Management Plan & Credit Release Schedule

The Credit Developer further refines the draft Management Plan to define the specific management actions and expected outcomes for the site including ongoing maintenance and monitoring requirements. The Credit Developer also includes a credit release schedule in the Management Plan, defining the amount of credits released based on the implementation of management actions and achievement of the desired habitat conditions as indicated by the HQTs.

Product ■ Management Plan

Secure Financial Assurances

The Credit Developer must secure necessary financial assurances. See *Section 2.4.6: Financial Assurances* for guidance. Financial assurances ensure that funds are available to cover credit shortfalls and support long-term management of individual project sites, as specified in the Management Plan.

Product ■ Management Plan with proof of secured financial assurances

Submit Post-Project Calculations & Documentation

The Credit Developer submits the final credit estimate and all required documentation to the Administrator for verification reflective of post-project conditions. Once the Administrator verifies the credit estimates and other documentation, the Management Plan is finalized and the Credit Developer and Administrator sign a Participant Contract.

Product ■ Signed Participant Contract
Product ■ Final Management Plan

Establish Verification Contract

The Credit Developer completes a contract with the Administrator for verification services. A sample contract is available in Appendix B: Tools, Forms & Templates.

Product ■ Completed Verification Contract

D3 VERIFY CONDITIONS

Figure 21: Verify Conditions

All projects require verification. Verification is an independent, expert check on the credit estimates provided by the Credit Developer, Technical Support Providers, or Aggregator. The purpose of verification is to provide confidence to all Credit System participants that credit calculations represent a faithful, true and fair account of impacts and benefits – free of material misstatement and conforming to accounting and credit generation standards. Ongoing verification ensures the project is maintained over time and supports the expected level of credit reflected in calculations. The required frequency of verification is defined in *Section 2.4.5: Credit Site Verification*.

Initial project verification is completed for the credit project before credits are issued, and periodically over the life of the project as defined in *Section 2.4.5: Credit Site Verification*. Self-Monitoring Reports must be completed in non-verification years to confirm that conditions are maintained according to the specifications in the Management Plan.

D3.1 SELECT VERIFIER

Upon receiving complete documentation and a finalized contract for verification services from the Credit Developer, the Administrator assigns an accredited third-party Verifier to perform a full verification.

Verifiers must be accredited by the Administrator before they are eligible to conduct verification activities. The independence of verification is important. Verifiers acting on behalf of the Administrator must work in a credible, independent, nondiscriminatory and transparent manner, complying with applicable state and federal laws. Verifiers must demonstrate their ability to professionally assess a specific type of credit without conflicts of interest. This includes disclosing any pre-existing relationships between the Credit Developer or Credit Buyer and the Verifier. Verifiers must provide a Conflict of Interest Form to the Administrator before verification can proceed.

Becoming an Accredited Verifier

The Credit System Administrator will accredit Verifiers to review credit projects. Verifiers will act as subcontractors to the Credit System Administrator. Verifiers bear no liability for project implementation or project performance. Interested Verifiers must complete the following steps:

- Attend a Verification Training Session
- Keep the Credit System Administrator informed of any changes affecting the accreditation (e.g. potential conflicts of interest)
- Participate in refresher courses held by the Credit System Administrator at least biannually

Product ■ Completed Conflict of Interest Form

D3.2 PERFORM ONGOING PROJECT MAINTENANCE AND MONITORING

The Credit Developer is responsible for monitoring and maintaining project conditions throughout the life of the project to ensure that on-the-ground conditions reflect the information provided in the verified credit estimate and Management Plan. Depending on the implemented conservation practices, project conditions may appropriately degrade throughout the year. Before project monitoring is finalized, the Credit Developer maintains the project as necessary to ensure that actual, on-the-ground conditions support the credits calculated in Step D2 and documented in the Management Plan. In years when an on-site verification is not required, the Credit Developer submits a Self-Monitoring Report to the

Administrator in accordance with the requirements defined in *Section 2.4.5: Credit Site Verification* and the specifics in the Management Plan.

Product ■ Self-Monitoring Report (non-verification years)

D3.3 PROJECT VERIFICATION

The Verifier confirms that:

- The Credit System Manual was followed completely and accurately.
- Appropriate documentation is in place (e.g. land protection or management agreements).
- The amount of credit issued for a project is appropriate given actual, on-the-ground conditions as verified through the HQT methods.
- For sites with future credit releases scheduled, management actions have been implemented and the desired performance criteria have been achieved as indicated by the HQT.

The Verifier performs a review of all relevant forms and documentation, and schedules a site visit with the Credit Developer[20]. The Verification Report is completed with information gathered during the site visit using the HQT User Guide. An example Verification Report and the HQT User Guide are available through the Administrator.

Credit calculations must be found to be free of material misstatements and meet the performance criteria defined in the Management Plan. If performance criteria are not met, the Verifier discusses the issues with the Credit Developer and Administrator. The Credit Developer and Administrator determine if corrective actions are necessary and appropriate, and the Administrator defines the appropriate amount of credit to be awarded given site conditions. If appropriate corrective actions or amount of credit cannot be agreed to by the Credit Developer and Administrator, then the Oversight Committee will facilitate the dispute resolution process.

Submit Project Verification Report

Once successful verification is complete, the Verifier submits their Verification Report to the Administrator. The Verification Report contains a summary of verification activities, an opinion on the credit estimates, and a log of activities and findings.

Product ■ Verification Report

D4 REGISTER PROJECT & ISSUE CREDITS

Figure 22: Register & Issue Credits

Registration ensures that credits from a specific project are real and traceable throughout the entire life of the project. All verified and certified credits generated through the Credit System must be registered. Supporting information related to each credit include vintage (year issued), HQT and Manual version used, duration of the credit, and owner of the credit.

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[20] Verifiers follow a defined Verification Protocol that is the focus of the Verifier certification training conduct by the Credit System Administrator.

D4.1 CREATE A CREDIT SYSTEM REGISTRY ACCOUNT

The Credit Developer sets up an account on the Credit System Registry. Once a Credit Developer establishes a user account, any number of projects can be registered under the same user account. The Administrator provides detailed guidance on using the Credit System Registry.

Product ■ Credit System Registry Account

D4.2 REGISTER PROJECT

The Credit Developer can register a project as soon as a project is validated (Step D1), and a project must be registered before credits can be released or transferred to Credit Buyers. Registering a project does not indicate a release of credits into the project account on the Credit System Registry (see step D4.3 below). The Credit Developer begins a new project on the Credit System Registry and uploads all required documentation, as specified by the Administrator.

The Administrator reviews all documentation before the project is registered. If errors are found or additional documentation is needed, the Administrator contacts the Credit Developer to request the needed information.

Product ■ Registered Project

D4.3 RELEASE CREDITS

The Credit Developer requests issuance after verification is complete and all required documentation is submitted to the Administrator. The Administrator confirms all documentation is complete, the amount of credits registered is correct, and issues the credits to the Credit Developer's registry account.

Product ■ Issued Credits

D5 TRACK & TRANSFER CREDITS

Figure 23: Track & Transfer Credits

Credits issued on the Credit System Registry are assigned unique serial numbers so that they can be tracked over time. Once issued, credits can be sold and transferred between Credit System Registry accounts. The sale, transfer and ownership of each credit are tracked by the Credit System Registry. The terms of payments and sales are completed external to any of the Credit System Registry or processes. All Credit System Registry activities, including credit transfers, are monitored by the Administrator.

D5.1 ALLOCATE CREDITS TO RESERVE ACCOUNTS

Reserve account allocation requirements are defined in *Section 2.4.3: Reserve Account Contribution* and identified for the specific project in Step D2.3. The Administrator allocates the appropriate amount of credits to the reserve account upon transfer to a Credit Buyer. Credits allocated to the reserve account are never available for sale.

Product ■ Notice of Transfer From

D5.2 SELL AND TRANSFER CREDITS

Credit Developers and Credit Buyers connect via the Credit System Registry. The price, terms and conditions are all set by the Credit Developers and Credit Buyers, and are completed external to any of the Credit System Registry or Administrator processes with the exception of provisions provided in the Participant Contract. Once an agreement to transfer credits is reached, the Credit Developer submits a Notice of Transfer Form to the Administrator, who transfers credits between accounts and assesses appropriate transaction fees.

All listed credits can be transferred between accounts until they expire and are no longer available to be transferred to another Credit Buyer. Thus, a Credit Buyer may resell and retransfer credits that have not expired and are no longer used to fulfill credit obligations to another Credit Buyer. Once credits expire, the Credit System Registry moves them into an expired credit account that can be reported on but not accessed for transfer.

The portion of credits from each transaction that are dedicated to the reserve account are transferred directly to the reserve account, which can be accessed by the Administrator in the future for authorized uses, such as to cover invalidated credits from a credit reversal.

Product ■ Notice of Transfer

D5.3 REPORT OF ACCOMPLISHMENTS (OPTIONAL)

The Administrator generates reports that summarize the amount of credit generated from each registered project and the total amount of credit generated from all registered projects. Supporting information related to each credit can also be produced, including vintage (year issued), HQT version, and duration of the credit. Reports can also be generated that show transfers of credits and expired credits.

Product ■ Accomplishments Report (optional)

SECTION 3.2: ACQUIRING CREDITS

QUESTIONS ANSWERED

- How does a Credit Buyer use credits to demonstrate mitigation requirements have been met?
- How does a Credit Buyer use credits to report on the accomplishments of their investments?

Figure 24: Credit Acquisition Overview

This section describes the process to acquire credits. Credit Buyers include entities mitigating for impacts to fulfill regulatory requirements, and entities seeking to improve the environment. The Credit System enables private and public Credit Buyers to efficiently invest with confidence, knowing that quantified environmental benefits are consistently defined, transparent and traceable. Credit Buyers can increase efficiency by relying on the programmatic structure to guide project design and verify that completed projects deliver expected environmental benefits. This increases accountability with Credit Developers and allows for greater coordination with other Credit Buyers to fund large-scale projects. Further, credits provide Credit Buyers with quantitative information to evaluate and report on the environmental value generated from their investments. Figure 24 and Table 22 provide an overview of the steps of credit acquisition and the different participants that may be engaged at each step.

Table 22: Overview of Roles, Tools & Products to Purchase, Track and Report Credits

Process Step	Credit Developer	Administrator	Credit Buyer	Relevant Forms & Templates	Completed Products
B1. Indicate interest		□	■	Sample Contract	List of Credit Developers & Credit Buyers
B2. Determine Credit Need		■	■	Credit Obligation & Project Design Form Verification Contract	Credit Need Specifications Project Baseline Assessment Verification Report Estimated Credit Obligation
B3. Purchase & Acquire Credits	□	■	■	n/a	Notice of Transfer
B4. Track & Transfer	■	■	■	Notice of Transfer Form	Annual Accomplishments Report

■ Indicates a necessary or active role
□ Indicates potential participation or a support role

B1 INDICATE INTEREST

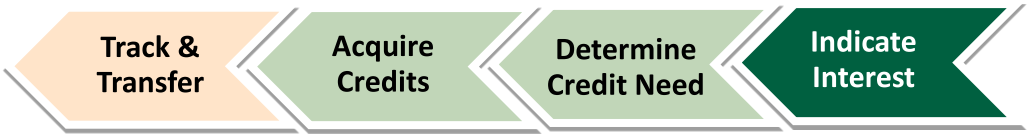

Figure 25: Indicate Interest

The Credit Buyer defines their investment goal and selects an appropriate strategy for acquiring credits.

B1.1 INDICATE INITIAL INTEREST & INITIATE COMMUNICATION

This first step for the Credit Buyer is to become aware of the opportunity or requirement to participate in the Credit System. The Credit Buyer is introduced to the Credit System through outreach materials or word of mouth, and learns about the potential benefits of participating. The Credit Buyer or the Credit Buyer's representative contacts the Administrator to provide basic information, such as name, area of interest and contact information. General information for how credits can be used to meet regulatory requirements is provided in *Section 2.1: Program Governance* with specific requirements in permits and regulatory instruments. The Administrator provides a list of Technical Support Providers in the project area who can assist with developing an investment strategy, if this assistance is desired. The Administrator compiles a list of identified Credit Developers and Credit Buyers.

Product ■ List of Identified Credit Developers & Credit Buyers

B2 DETERMINE CREDIT NEED

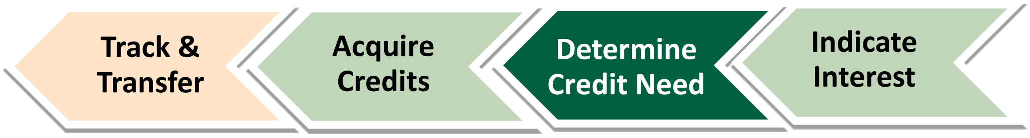

Figure 26: Determine Credit Need

Credit Buyers determine the geographic region, duration and amount of credit needed to best meet their regulatory requirements or investment goals.

B2.1 DETERMINE APPLICABLE GEOGRAPHY & PROJECT CHARACTERISTICS

The Credit Buyer identifies the specific geographic region from which to purchase Credits, in accordance with their investment goal. *Section 2.3.1: Credit Service Area* defines the applicable geographic scope of the Credit System and *Section 2.2.2: Mitigation and Proximity Ratios* defines the proximity ratio applied to debits and determined by the proximity between the debit site and offsetting credit site. Credit Buyers may also choose to focus investment within a specific geographic area to achieve unique investment goals.

The Buyer must also consider the duration or term to purchase credits. Projects produce credits for specific durations of time, including some projects which produce credits perpetually. *Section 2.5.4: Debit Project Duration* defines specific parameters for project duration.

The Buyer may also be interested in other characteristics that would focus investment on specific project types or Credit Developers. For instance, the Credit Buyer may want to only invest in projects that produce new habitat on working lands from small farms and ranches.

Product ■ Determination of Credit or Project Specifications

B2.2 DETERMINE CREDIT AMOUNT (REGULATORY OFFSET CREDIT BUYERS ONLY)

Each Credit Buyer defines their needed or desired amount of credit. If the Credit Buyer is not in a regulatory context, skip ahead to Step B3.

The remainder of this step defines the process to determine the amount of debit resulting from anthropogenic disturbances and the associated credit obligation to offset these impacts in a regulatory context. Development activities must be avoided and minimized through the SETT Consultation process, using best available and practicable technology and practice. Full compliance with all relevant laws and rules is required before credits can be used to satisfy the remaining regulatory requirements from unavoidable impacts.

Debits are quantified and verified units of functional acre loss using the HQT, and adjusted based on a mitigation ratio defined in *Section 2.2.2: Mitigation and Proximity Ratios*. The number of credits that must be acquired to offset the debits generated is the number of debits calculated adjusted by the proximity ratio defined in *Section 2.2.2: Mitigation and Proximity Ratios*. The process to calculate and verify debits is the same as the process to quantify credits except that verification occurs prior to project implementation. The following sections are a summary of that process. See Step D2 for additional information on calculating credits from a credit site.

Define & Submit Baseline Assessment

Credit Buyers first define the project boundary using guidance in the HQT. For debits, baseline is defined as the condition of the site prior to any new or expansion of an existing anthropogenic disturbance. Debit sites require a field assessment to determine pre-project conditions. The Credit Buyer conducts an assessment of the project area and applies the applicable HQT to calculate the baseline site functionality. Field and data collection forms are used to run the HQT and generate a habitat function score. The project baseline information, photo point documentation and HQT scores are submitted to the Administrator. As described later in this step, third party verification commissioned by the Administrator of debit baseline habitat function scores is required before the anthropogenic disturbance can be implemented. Since there are specific permissible windows for collecting official habitat function scores, commissioning an approved third-party Verifier to conduct the field assessment and gaining pre-approval from the Administrator to use those scores as the verified scores may be preferred by the Credit Developer to avoid a delay in the permitting process.

The Administrator reviews the baseline information and confirms all calculations are complete and consistent with relevant regulatory guidance, and allows the project to proceed.

Product ■ Complete Baseline Assessment

Determine Credit Obligation

A Credit Buyer's credit obligation is based on the difference between baseline functional acres and anticipated post-project functional acres, adjusted by mitigation and proximity ratio as defined in *Section 2.2: Habitat Quantification and Credit and Debit Calculation*. The estimated post-project habitat function is produced using the baseline functional acre assessment and development design documents defining the area, scope and activities to be completed as part of the development actions. The data sets are entered in the HQT, which produce the functional acre loss, debits and the credit obligation, and are submitted to the Administrator.

Product ■ Estimated Credit Obligation & Project Design Form

Acquire Agency Approval (If Necessary)

Consult with development permitting agencies for specific permit requirements to determine if agency approval is needed to use credits for regulatory offsets.

Establish Verification Contract

The Credit Buyer completes a contract with the Administrator for verification services. A sample contract is available in Appendix B: Tools, Forms & Templates.

Product ■ Complete Verification Contract

Verify Baseline

Verification of debits, like credits, is an independent review of all projects by third parties. Once final versions of all required documents are submitted to the Administrator, the Administrator reviews documentation to ensure completeness and assigns an accredited third-party Verifier to perform a full verification. Verification of debit baseline functional acres occurs before the anthropogenic disturbance has been implemented.

Once successful verification is complete, the Verifier submits the Verification Report to the Administrator. The Verification Report contains a summary of verification activities, an opinion on the debit estimates and a log of activities and findings.

Product ■ Verification Report

Post-Project Verification (If Necessary)

Consult *Section 2.5.6: Debit Site Verification* and specific permit requirements to determine if post-project verification is required to ensure that the amount of debit is not greater than what was estimated during project design.

B3 ACQUIRE CREDITS

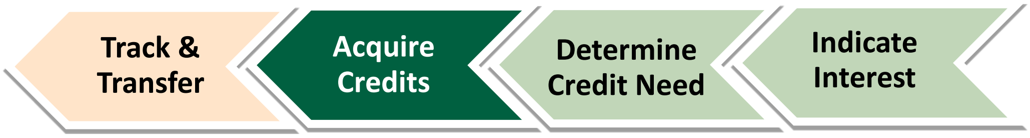

Figure 27: Acquire Credits

B3.1 SUBMIT PROJECT INFORMATION

To acquire and track credits, the Credit Buyer contacts the Administrator to provide information about the debit and credit obligation in order to acquire needed credits. All information provided to the Administrator is subject to the confidentiality provisions described in *Section 2.1.7: Participant Confidentiality*.

B3.2 PURCHASE CREDITS

Credit Developers and Credit Buyers connect via the Credit System Registry, and come to agreement on credit quantities, price, timing of funding, and other terms. The terms of payments and sales are completed between Credit Developers and Credit Buyers, external to any of the Credit System Registry or Administrator processes. Once an agreement is complete, the Credit Buyer or Credit Developer submits a Notice of Transfer to the Administrator.

Product ■ Notice of Transfer

B4 TRACK & TRANSFER CREDITS

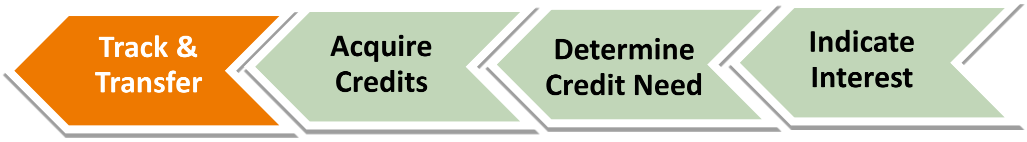

Figure 28: Track & Transfer Credits

Credits and debits are assigned unique serial numbers that identify the source of each credit or debit, the HQT and version used to estimate credits and debits, and the current owner. All registered projects are tracked by the Administrator, and information is subject to confidentiality provisions defined in *Section 2.1.7: Participant Confidentiality*. The terms of payments and sales are completed external to any of the Credit System Registry or Administrator processes.

B4.1 TRANSFER CREDITS

Upon receiving a Notice of Transfer, the Administrator transfers credits between accounts. Credits used to fulfill credit obligations are not available for resale. All remaining credits may be held by the Credit Buyer or resold. Even after transfer, the Credit Developer is responsible for meeting the monitoring, reporting and verification requirements of each project for the life of the project (described in *Section Step D3 in Section 3*).

B4.2 REPORT ON ACCOMPLISHMENTS (OPTIONAL)

The Administrator can generate reports for Credit Buyers that show transfers of credits and expired credits.

Product ■ Annual Accomplishments Reports

SECTION 3.3: ADAPTIVELY MANAGING THE CREDIT SYSTEM

QUESTIONS ANSWERED

- How is the Credit System managed to improve accuracy and efficiency without causing market uncertainty?
- What information is reported to ensure transparency and increase accountability?
- How are research and monitoring findings synthesized and used to improve the Credit System?
- How are Credit System improvement recommendations developed and used to inform annual Credit System improvement decisions?

The Credit System Management System is defined as a formal, structured programmatic adaptive management approach to dealing with uncertainty in natural resources management, using the experience of management and the results of research as an ongoing feedback loop for continuous improvement. This section describes the transparent and inclusive management process used for the Credit System. The Credit System Management System requires an ongoing flow of information from 1) research and monitoring activities conducted by scientists, 2) the practical experiences of Credit Developers and Credit Buyers, and 3) changing context from stakeholders to inform Credit System improvements. A systematic and transparent decision making process ensures that improvements to the Credit System do not cause uncertainty for participants. Figure 29 and Table 23 provide an overview of the Credit System Management System steps and the different participants that may be engaged at each step[21].

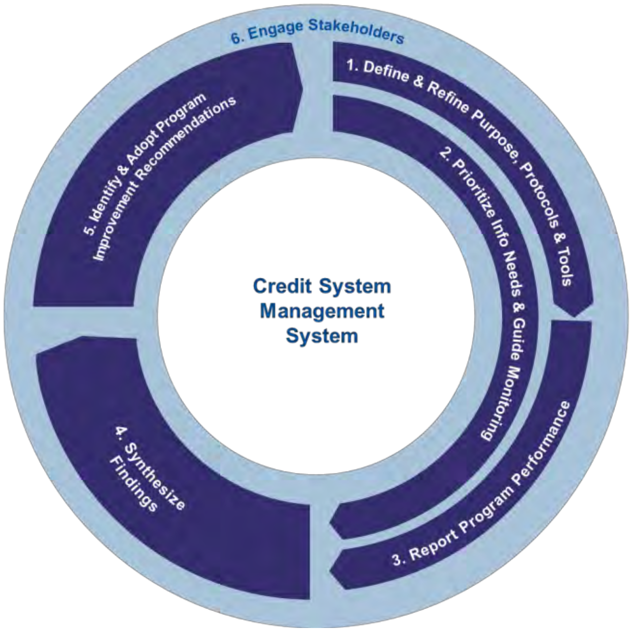

Figure 29: Overview of Credit System Improvement Management System Steps

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[21] This management process has been adapted from The Conservation Measures Partnership's Open Standards for the Practice of Conservation, which can be found at www.conservationmeasures.org. Significant changes were made to adapt the Open Standards to 1) a market context where individual projects are selected and implemented by individual market participants and 2) be a formally governed process that balances the needs for improvements with the needs to limit market uncertainty for all participants.

The Administrator performs the day-to-day functions to manage the Credit System. The Administrator is accountable to an Oversight Committee, which approves all changes to the Credit System Manual and HQT. The composition of the Oversight Committee and the relationship between the Oversight Committee, Administrator and Credit System participants are defined in *Section 2.1.1: Governance Roles*.

Table 23: Overview of Roles, Tools & Products to Manage Credit System Operations

Process Step	**Credit Developer & Credit Byers**	**Administrator**	**Oversight Committee**	**Science Committee & Stakeholders**	**Relevant Forms & Templates**	**Completed Products**
A1. Update Protocol & Tools	☐	■	☐	■	▪ Credit System Improvement Recommendation Form	▪ Credit System Improvements List ▪ New & Updated Documents, Guidance and Tools
A2. Prioritize Information Needs & Guide Monitoring	☐	■	☐	■	▪ Research & Monitoring Contract Templates	▪ List of Research Needs
A3. Report Credit System Performance	☐	■	☐	☐	▪ Performance Report Template	▪ Annual Performance Report
A4. Synthesize Findings	■	■	■	■	▪ Input Request Template	▪ Synthesis of Findings Report
A5. Identify & Adopt Credit System Improvement Recommendations	☐	■	■	☐	▪ Credit System Improvement Recommendation Form	▪ Credit System Improvements Recommendations ▪ Record of Decisions ▪ Audit Report
A6. Engage Stakeholders	☐	■	■	■	▪ n/a	▪ Updated Website ▪ Quarterly Email Updates ▪ Stakeholder Meeting ▪ Summary of Input

■ Indicates a necessary or active role
☐ Indicates potential participation or a support role

A1 UPDATE PROTOCOL & TOOLS

Figure 30: Update Manual & Tools

This Credit System Manual and associated tools, templates and forms provide guidance for the Credit System to consistently track and report benefits and impacts. Updating the Credit System Manual, tools, templates, and forms is necessary to ensure practical experience and new scientific information result in increased efficiency and effectiveness. This step describes the process for the Credit System to review and update guidance documents, policies and tools.

A1.1 UPDATE CREDIT SYSTEM IMPROVEMENTS LIST

Credit System participants, the Administrator and other stakeholders may make suggestions to improve the Credit System at any time throughout the year by submitting a recommendation through the Credit System website. The Administrator adds recommendations received to the compiled Credit System Improvements List. The Administrator may also add improvement recommendations to the list reflecting personal experience or non-formal input from stakeholders. The Credit System Improvements List ensures that suggestions are not overlooked during the annual Credit System adjustment process.

Product ■ Credit System Improvements List

Review & Sort Improvement Suggestions

The Administrator reviews the Credit System Improvements List throughout the year and identifies relevant thematic changes that are categorized according to the following definitions:

- **Category 1** improvements consist of minor administrative adjustments or clarifications to communication or guidance materials that does not change the intent, form or operations. Category 1 improvements may be executed by the Administrator at any time; however the Oversight Committee and public must be informed of these changes as they occur.
- **Category 2** improvements are substantive changes to technical tools, protocols or guidance. Category 2 adjustments require input and approval from the Oversight Committee before they are implemented. The process for Oversight Committee review and adoption is defined in Step A5: Identify & Adopt Credit System Improvement Recommendations. When in doubt, the Administrator assigns the recommendation to Category 2. Upon review by the Oversight Committee, these suggestions may be re-categorized as needed.
- **Category 3** improvements necessitate adjustments to related policies if adopted. Category 3 adjustments are reviewed and approved or rejected by the Oversight Committee with consultation from the appropriate agency staff. These improvements may require agency approval, and thus follow the appropriate policy change process as defined by relevant state and federal agencies.

It is at the discretion of the Administrator, with guidance from the Oversight Committee, to prioritize funding to implement the most important improvements which can be successfully completed using available resources. The Administrator provides a prioritized Credit System Improvements List to the Oversight Committee, which includes Category 1 improvements implemented so that they can be reviewed and confirmed by the Oversight Committee. The Oversight Committee decides which improvement recommendations are to be implemented, at the periodic meetings described in Step A5:

Identify & Adopt Credit System Improvement Recommendations. For improvements that require additional time or resources to implement, the Administrator develops a brief implementation plan that is approved by the Oversight Committee.

Product ■ Updated Credit System Improvements List

A1.2 UPDATE EXISTING HQT, FORMS AND TEMPLATES

The Administrator may implement Category 1 improvements throughout the year. The Administrator implements all additional approved Category 2 and 3 improvements within a timeline approved by the Oversight Committee. The date at which updates go into effect should be clearly defined by the Oversight Committee with the expectation that changes which may affect the amount of credit generated from a project are not applied to previously registered projects.

Product ■ Updated Documents, Guidance & Tools

A1.3 INTEGRATE NEW AND ALTERNATIVE QUANTIFICATION TOOLS

The Credit System Manual is built to easily integrate new credit types (e.g. mule deer) and new or alternative HQTs. Once a new credit type and a new or alternative quantification tool is identified as needed, the Administrator convenes a technical committee to assess the proposed method and provide recommendations for improvement or adoption. Quantification tools require several field tests to determine accuracy, repeatability, sensitivity and ease of use. Once improvement recommendations are addressed, the Administrator presents the proposed new or alternative quantification tool, with supporting materials that define the use of any new credit types, to the Oversight Committee for review and approval (as described in Step A5: Identify & Adopt Credit System Improvement Recommendations).

Product ■ New Quantification Tools

Recommended Research and Monitoring Contract Terms

Research and monitoring contracts should reflect the need for clear, timely and consistently presented- findings so that findings can be easily used to address identified needs. Specific contract requirements can increase the likelihood that funded research and monitoring projects produce directly useful findings by:

- Identifying specific questions for investigators to address through specific projects.
- Requesting a one-to-two page summary of findings that directly relates findings to identified questions and related items on the List of Areas for Investigation.
- Requiring that reports be submitted in a timely manner so findings may be considered in the development of the Synthesis of Findings Report (Step A4).
- Requesting interim updates for long-duration projects, in order for these projects to provide insights with potential to influence current decisions and future expectations.
- Holding final payments until a draft report has been reviewed by an appropriate group of participants and review comments have been satisfactorily addressed.

A2 PRIORITIZE INFORMATION NEEDS & GUIDE MONITORING

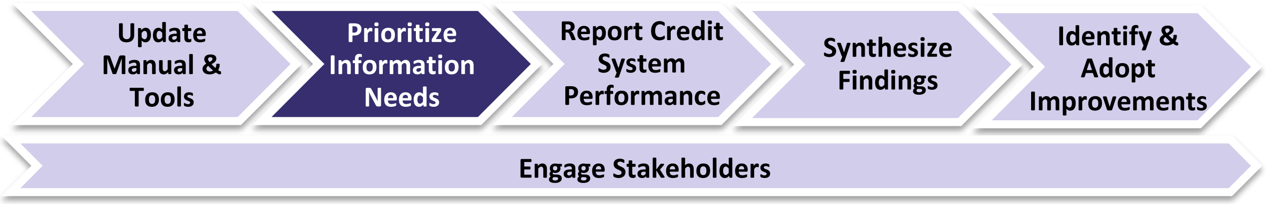

Figure 31: Prioritize Information Needs & Guide Monitoring

Monitoring and research are necessary to check that the habitat benefits projected by the HQT result in the projected improvements for the habitat attributes of concern. The Credit System may collaborate with monitoring initiatives led by other active programs in the region or initiate its own research with approval from the Oversight Committee.

A2.1 DEVELOP & ADJUST LIST OF AREAS FOR INVESTIGATION

The Administrator takes input from the Science Committee and other technical experts and maintains the List of Research Needs. The List of Research Needs catalogs and prioritizes research and monitoring needs identified by participants as being important to improve HQT, better understand the effectiveness of management actions and impact of anthropogenic disturbances, and follow the status and trend of habitat attributes of concern.

The Credit System may be able to collaborate with other monitoring programs to monitor status and trend of habitat conditions and greater sage-grouse populations, but is likely to take a more active role in directing monitoring intended to calibrate HQTs and improve their accuracy. The HQT estimates the amount of credit expected from credit projects based on technical assumptions. These assumptions are tested by technical experts and practitioners conducting monitoring and research to address items on the List of Research Needs. Scientists review results and improve HQT and associated field methods accordingly.

Product ■ List of Research Needs

A2.2 PROVIDE INPUT TO RESEARCH & MONITORING FUNDING PROCESSES

The Administrator coordinates with participants, regulators, technical support, grant funders and stakeholders to identify and secure funding for priority needs identified on the List Research Needs. Research and monitoring may be conducted through direct contracts with the Credit System funded through transaction fees or conducted through partnerships with existing monitoring programs, or any other parties.

Product ■ Research & Monitoring Contracts and Results

A3 REPORT CREDIT SYSTEM PERFORMANCE

Figure 32: Report Credit System Performance

Routine reporting of accomplishments is essential to ensure transparency and drive accountability. The annual Credit System Performance Report (Performance Report) reports all credits tracked by the Credit System and informs interested parties of recent changes to the Credit System. The Performance Report highlights successes and challenges from the past year, both regionally and for each specific geographic area of interest. This is the highest profile product produced by the Credit System and is targeted to an informed public audience.

Recommended Performance Report Content

The use of a standard report template both increases efficiency and enhances understanding by providing information in a consistent format. The Performance Report addresses:

- Overall credit and debit results from the past year and over the life of the Credit System, including progress towards goals
- Credits and debits within specific geographic areas of interest
- Summary of recent and expected near-term changes

A3.1 COMPILE CONTENT & PUBLISH PERFORMANCE REPORT

The Administrator uses tracking outputs, such as the number of credits created during the year, to generate the quantitative information for the Performance Report, which includes a ledger of all credits and debits generated cumulatively and each year to demonstrate net benefit for greater sage-grouse. Credits are summed across geographic locations and for each specific area of interest. Additionally, information related to non-habitat accomplishments may also be highlighted, such as administrative improvements. The Performance Report is posted online and submitted to any relevant regulatory agencies.

The Administrator updates the content from the previous year's Performance Report and develops a narrative summary of overall accomplishments, and projected improvements to the Credit System over the past year. The Performance Report is annually approved by the Oversight Committee. It is then posted to the Credit System website within an appropriate timeframe and available to all interested stakeholders.

Product ■ Annual Credit System Performance Report

A4 SYNTHESIZE FINDINGS

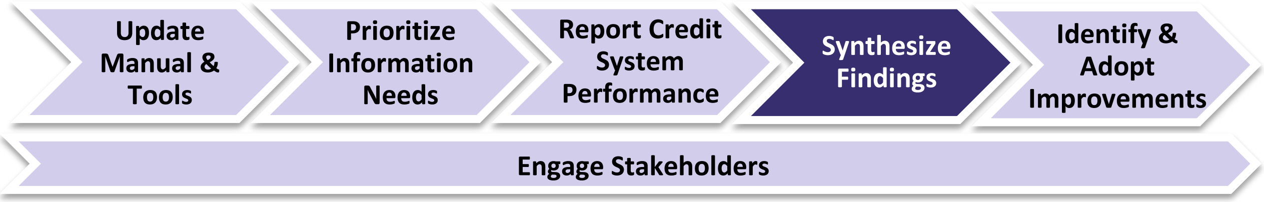

Figure 33: Synthesize Findings

Synthesizing findings into information that is directly related to the operations of the Credit System is essential to inform management decisions. The Synthesis of Findings Report bridges the gaps between the Oversight Committee, Credit System participants, engaged scientists, and agency staff, by synthesizing learning from experience implementing the Credit System and from new monitoring and research findings. It is not intended to be a comprehensive review of all literature and available information. Providing highly-nuanced recommendations with extensive discussion does not meet the primary audience's needs. Rather, findings are presented in clear statements. Supporting information should be targeted, providing the most relevant information necessary to understand the issues in context of the Credit System.

The Synthesis of Findings report is developed by the Administrator annually. A more formal review of the Credit System and committee structure is recommended to occur at least every fifth year.

A4.1 COMPILE FINDINGS & DEVELOP SYNTHESIS OF FINDINGS REPORT

The Administrator requests input from participants and relevant stakeholders, including posting an invitation for input to the Credit System website. Findings may address needs related to improving 1) the accuracy of credit estimation and verification methods, 2) the effectiveness of different management actions, and 3) the efficiency of Credit System operations. The Administrator decides how to catalogue and organize input received and develops a brief report to present to the Oversight Committee.

Product ■ Synthesis of Findings Report

A5 IDENTIFY & ADOPT CREDIT SYSTEM IMPROVEMENT RECOMMENDATIONS

Figure 34: Identify & Adopt Credit System Improvement Recommendations

Creating and transparently adopting clear recommendations to improve the Credit System is the most critical step in the annual Credit System management process. The predictability and transparency of the adjustment process enables Credit Developers, Credit Buyers and other stakeholders to adjust practices and expectations without causing market uncertainty or disruptions that result in participants becoming resistant to changes.

A5.1 PROPOSE CREDIT SYSTEM IMPROVEMENT RECOMMENDATIONS

The process for maintaining and prioritizing the Credit System Improvements List is described in Step A1: Update Credit System Improvements List. The Credit System Improvement List and the Synthesis of Findings Report are the most critical inputs for the Administrator to consider when identifying Credit System Improvement Recommendations.

Develop Credit System Improvement Recommendations

The Administrator reviews the Credit System Improvements List and identifies priority improvements to recommend to the Oversight Committee for implementation. The Administrator will engage the Science Committee in the development and prioritization of the Improvements List. The Administrator describes the following for each recommended improvement:

- Clear statement of need for change and expected improvements to efficiency or effectiveness resulting from implementing the change.
- Description of what specific portions of documents, forms, guidance, or the HQT will be changed, potentially including red-line versions of recommended changes.
- Identification of any potential complications or impacts the change may have to stakeholders or to the Credit System.
- For changes that require contract resources or greater than one-month to implement, a brief implementation plan with associated budget.

Recommendations are grouped by the Categories described in Step A1.1. Note, all Category 1 improvements implemented by the Administrator during the year are documented and may be reviewed by the Oversight Committee to confirm that changes are acceptable.

Product ■ Draft Credit System Improvement Recommendations

Develop Final Recommendations

The Credit System Improvement Recommendations are sent to the Oversight Committee for review in advance of the next Oversight Committee meeting. The Oversight Committee members discuss recommendations of interest or concern with the Administrator and consult stakeholders as necessary.

Product ■ Final Credit System Improvement Recommendations

A5.2 ADOPT CREDIT SYSTEM IMPROVEMENTS

The Oversight Committee meets, discusses and considers adopting Credit System Improvement Recommendations at least annually. For policy decisions and those directly related to regulatory or funding requirements, the decision may be to bring a proposal before relevant agency management or other decision making authorities.

The Oversight Committee designates an individual to compile a Record of Decisions. A Record of Decisions defines the agreed-to changes, the rationale, the party responsible for implementing the changes, and the date when changes go into effect for any new projects or operational practices. Changes do not alter the amount of credit available from previously registered projects for the duration of the project, and should not require changes to existing project management plans or credit obligations. Any recommendations not acted upon are addressed by providing a brief rationale and an indication of whether the recommendation may be considered at a later date or if the recommendation has been rejected and should not be brought back in the future.

Product ■ Record of Decisions

A5.3 OVERSEE CREDIT SYSTEM OPERATIONS

Annually, the Oversight Committee conducts or designates an independent entity to conduct a third-party audit of Credit System operations, including a detailed review of a portion of individual credit and debit sites. The audit confirms that procedures are being consistently followed, all documentation is present and complete, and all Credit System management products are developed and maintained. An Audit Report describes the audit procedures, findings and any proposed areas where corrective actions should be considered. The Audit Report is made available to the Oversight Committee and discussed at a subsequent Oversight Committee meeting. The final Audit Report, less information identified as confidential, is posted to the Credit System website.

Product ■ Audit Report

A5.4 RESOLVE OUTSTANDING DISPUTES

As defined in the dispute resolution process defined in Step D3, the Oversight Committee or a subcommittee of the Oversight Committee resolves disputes between Credit System participants that cannot be resolve independently or in consultation with the Administrator. If the dispute is in reference to regulatory requirements, the regulatory agency has the final decision-making authority.

A6 ENGAGE STAKEHOLDERS

Figure 35: Engage Stakeholders

Consistent stakeholder engagement is necessary to ensure the Credit System operates efficiently, increases understanding, and drives accountability. Stakeholder engagement occurs throughout the year using the reports and products defined in Steps A1-A5, as well as through email and in-person engagements.

A6.1 MAINTAIN CREDIT SYSTEM WEBSITE

The Administrator maintains the Credit System website as the central location for all publicly available information not deemed confidential. This includes all tools, guidance and reference materials related to the Credit System. The website also informs interested stakeholders of upcoming events and meetings, and provides the opportunity for stakeholders to provide Credit System improvement recommendations (as described in A1).

Product ■ Updated Credit System Website

A6.2 DISTRIBUTE UPDATE EMAILS

The Administrator maintains an ongoing list of interested stakeholders and their email contact information. The Administrator disseminates a periodic email update to interested stakeholders to provide information about Credit System progress. Email updates also notify stakeholders when reports are expected to be available for public review, and about upcoming opportunities for in-person engagement.

Product ■ Email Communications

A6.3 PRESENT AT COMMUNITY FORUMS

The Administrator and other participants may make presentations at community events and meetings upon request and as resources are available. This is critical to ensure local groups understand the basic functions and role of the Credit System and understand how they may be able to participate.

Product ■ Community Presentations

A6.4 CONDUCT TRAININGS

The Administrator or experienced Technical Support Providers periodically conducts trainings to teach potential Credit System participants how to efficiently use the Credit System, including guidance on using tools and forms. These trainings are generally open to all interested parties. Verifier certification trainings are conducted as needed with an expectation of at least annually.

Product ■ Hosted Trainings

A6.5 CONVENE ANNUAL STAKEHOLDER MEETING

The Administrator annually convenes meeting open to all stakeholders. This meeting is an opportunity to highlight accomplishments and identify areas for improvement with participants and interested stakeholders. The meeting is held after the annual Performance Report is posted to the Credit System website for review, and before final Program Improvement Recommendations are considered by the Oversight Committee (as described in Step A5).

At this annual meeting, stakeholder input should be structured such that input directly related to identified areas of operational improvement and areas for investigation are recorded in context of the specific need. Stakeholders also should have the opportunity to identify new needs and concerns for consideration. Input may be added to the Credit System Improvements List or List of Research Needs.

Stakeholder input that does not directly relate to these ongoing lists of needs is summarized and the notes posted to the Credit System website.

Product ■ Stakeholder Meeting & Summary of Input Received

APPENDIX A: GLOSSARY

Additionality: Habitat functionality improvements that represent an overall increase in, or avoided reduction of, habitat functionality, relative to the habitat functionality that would occur in absence of the Credit System.

Administrator: An organization or entity responsible for managing the day-to-day operations of the Credit System, including facilitating and overseeing all credit generation and transaction activities.

Aggregator: A person or institution that works with multiple landowners to implement credit projects, secure performance assurances, and register and sell credits. An Aggregator facilitates financial transactions between the Credit Buyers and Credit Developers, and may charge a fee for the service, but is not directly involved in the chain of ownership of credits.

Baseline: The starting point for calculating the functional acres generated by a credit or debit, which is the difference between baseline and post-project functional acres. Baseline does not necessarily mean pre-project condition.

Candidate Conservation Agreement (CCA): A formal agreement between the USFWS and one or more Federal or non-Federal parties to address the conservation needs of proposed or candidate species, or species likely to become candidates for listing under the Endangered Species Act, in which participants voluntarily commit to implementing specific actions that will remove or reduce the threats to these species, so that listing is no longer necessary.[22]

Candidate Conservation Agreement with Assurances (CCAA): A formal agreement between the USFWS or NMFS and one or more non-Federal parties who voluntarily agree to manage their lands or waters to remove threats to candidate or proposed species and in exchange receive assurances that their conservation efforts will not result in future regulatory obligations in excess of those they agreed to at the time they entered into the Agreement.[23]

Competing Land Uses: Land uses that reduce the functionality of habitat and invalidate the credits being generated on a site.

Compensatory Mitigation: The stewardship or restoration of habitat to compensate for unavoidable adverse impacts to the habitat elsewhere.[24]

Condition: Condition is the relative ability of a site to support and maintain its complexity and capacity for self-organization with respect to species composition, physicochemical characteristics and functional processes.

Conservation Action: Actions to conserve habitat and do not generate credits.

Conflict of Interest: A situation in which, because of activities or relationships with or perceived to be with other persons or organizations, a person or firm is unable or potentially unable to render an impartial verification opinion of Credit Developer's estimated credits.

Credit: A quantifiable unit of a greater sage-grouse habitat conservation value which serves as the currency in the Credit System. A credit is a measure of the difference between credit baseline functional acres (see Functional Acre definition) and post-project functional acres multiplied by a mitigation ratio. Credits are consistently quantified and traded, and secured by contract requirements, a project-specific Management Plan and financial assurances.

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[22] USFWS DRAFT GRSG Mitigation Framework Glossary

[23] USFWS DRAFT GRSG Mitigation Framework Glossary

[24] USFWS DRAFT GRSG Mitigation Framework Glossary revised

Credit Buyer: An entity that purchases credits for a range of reasons including general conservation purposes or mitigating the adverse effects of a debit project.

Credit Developer: Landowners or managers who produce and sell credits in the Credit System.

Credit Obligation: Quantity of credits that must be acquired to offset debits generated by a debit project. Credit obligation is the number of debits calculated using the HQT and debit mitigation ratio adjusted by the proximity ratio, determined by the proximity between the debit site and offsetting credit site.

Credit Project: Management actions and administrative requirements including a Participant Contract and Management Plan that create a credit.

Credit Release: An award of credits made available for transfer by the Administrator to a Credit Developer upon meeting specified management and performance criteria.

Credit Site Eligibility: A set of requirements that a credit project site must meet in order to be able to participate in the Credit System.

Agreement: A signed agreement between the Administrator and other public agencies that authorizing the use of Credit System credits for mitigation purposes within the State of Nevada, or between the Administrator and other parties to use Credit System tools and procedures.

Credit System Operations: A set of rules that defines the universal processes through which credits and debits are generated, tracked, and traded within the Credit System.

Credit Variability: Fluctuations in the generation of credits and debits on a project site that are created due to factors that are outside the control of the participants, such as environmental conditions and climatic effects.

Debit: A quantifiable unit of loss to greater sage-grouse habitat conservation value from an impact. A debit is a measure of the difference between debit baseline functional acres (see Functional Acre definition) and post-project functional acres multiplied by a mitigation ratio (but not yet multiplied by proximity factor), and are based on the same methods and HQT used to calculate credits.

Debit Project: An anthropogenic disturbance that creates a debit.

Direct Impact: The effects that are caused by, or will ultimately result from, the direct footprint of a debit project.

Durability: Credit projects that demonstrate defined habitat functionality performance prior to credit release through the end of the project's duration.

Dynamic Offsets: When a stream of term credits are used to cover a debit, such that the mitigation is functionally the same duration as the debit but shifts on the landscape.

Ecosystem Services: The benefits people obtain from nature. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling.

Financial Assurances: Mechanism to ensure that funds are available to replace credits invalidated by intentional causes, and to ensure funds are available for long-term management and monitoring of individual project sites.

Force majeure: Event or circumstance beyond the control of Participants under which they are not liable. This includes Acts of God, including fire, flood, earthquake, storm, hurricane or other natural disasters.

Functional Acre: The single unit of value that expresses the assessment of quantity (acreage) and quality (function) of habitat or projected habitat through the quantification of a range-wide scale, landscape-scale, local-scale and site-scale attributes defined in the *HQT Scientific Methods Document*.

Habitat Conservation Plan (HCP): A conservation plan that specifies the anticipated effects of a proposed activity on the taking (see "*Incidental take*") of federally-listed species and how those impacts will be minimized and mitigated. The HCP is submitted with an incidental take permit application to the USFWS or NMFS. Incidental take permits are available to private landowners, State and local governments, Tribal governments and other non-Federal landowners through section 10 of the Endangered Species Act.[25]

Habitat Function: The ability or value of a measured patch of land to meet the needs of greater sage-grouse.

Habitat Suitability Index (HSI): A continuous map surface developed by Nevada's Sagebrush Ecosystem Program that contains the probability of use by sage-grouse per pixel across Nevada. This surface is represented by probability values that range across a continuous spectrum of 0.0 to 1.0.

Habitat Quantification Tool: A set of metrics (i.e. measurements and methods), applied at multiple spatial scales, to evaluate current conditions and changes in conditions indicative of habitat quality, baseline, and mitigation ratios to determine the amount of total credit or credit obligation debit resulting from credit and debit projects. The attributes measured and methods used to measure those attributes are defined in the *HQT Scientific Methods Document*.

Incidental Take: take of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity. Incidental take may be authorized through section 7 or 10 of the Endangered Species Act.[26]

Indirect Impact: Effects that are caused by or will ultimately result from a debit project. Indirect impacts could occur at some point in the future or outside of the direct footprint of the debit project site.

Landscape Scale (2nd order): 2nd order selection is described by the home range of a sage-grouse population or subpopulation, and attributes are measured to delineate the best areas for conservation and identify where credit projects should be targeted and disturbances should be avoided.

Local Scale (3rd order): 3rd order selection is based on sage-grouse use of, and movement between, seasonal habitats within their home range according to their life cycle needs, and attributes are measured to consider the availability of suitable habitat and the effects of anthropogenic disturbances.

Management Actions: Stewardship and restoration of a site in order to generate credits.

Management Plan: Plan that defines specific restoration and management actions over the life of a credit project, including ongoing maintenance and monitoring requirements. Plan includes existing project site information, such as a site map and information on current management practices, and anticipated project start and end dates, and any management limitations.

Management Process: A formal, structured programmatic adaptive management approach to dealing with uncertainty in natural resources management, using the experience of management and the results of research as an ongoing feedback loop for continuous improvement.

Map unit: Sub-divisions of the project area based on unique vegetation communities and vegetation structure.

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[25] USFWS DRAFT GRSG Mitigation Framework Glossary

[26] USFWS DRAFT GRSG Mitigation Framework Glossary

Mitigation: Stewardship or restoration of habitat to compensate for unavoidable adverse impacts from a debit project and verified through the Credit System. Credit projects are mitigation for debit projects.

Monitoring: The process to observe and record current environmental conditions, changes in environmental conditions and effects of management actions over space and time.

Offset: *See Mitigation*.

Oversight Committee: Formal, representative stakeholder group, which is responsible for overseeing the operations of the Credit System and making Credit System management decisions. The Sagebrush Ecosystem Council serves as the Oversight Committee.

Participant: General term for all entities participating in the Credit System, with the exception of the Administrator and the Oversight Committee. Participants include: Credit Developers, Credit Buyers, Technical Support Providers, Aggregators, and Verifiers.

Participant Contract: Legal agreement between one or more Credit Developers and the Administrator that defines obligations of the Credit Developers and secured financial assurances, binds a participating credit site to a Management Plan, and lays out the relevant terms and conditions for the development of credits under the Credit System.

Participant Confidentiality: Processes to ensure sufficient information is available to monitor compliance, ensure progress toward environmental goals, and inform a robust Credit System management process, while not revealing identifying information of participants.

Performance Standards: Management actions and habitat function described in a credit project's Management Plan that defined credit project expectations including requirements for credit releases.

Project Duration: The period of time that the Credit System recognizes a credit or debit before requiring that the project be renewed using current HQT and protocols.

Range-wide Scale (1st order): 1st order selection is described by the geographic range of the sage-grouse population in Nevada.

Rehabilitate: Return habitat function of a debit site to pre-project or better condition.

Remedial Action Plan: Any corrective measure which the Administrator or a Credit Developer is required to take to correct an adverse impact to a participating credit site as a result of a failure to achieve the performance criteria outlined the site's Management Plan.

Remediate: Correction of an adverse impact to a credit site.

Reserve Account: A pool of credits, funded by a percentage of the credits transferred in each transaction, that are used to cover shortfalls when credits that have been generated and sold are invalidated due to contract breach, a force majeure, or other circumstances. The Reserve Account helps to ensure that there is always a net positive amount of habitat tracked under the Credit System.

Restoration: The reestablishment of ecologically important habitat or other ecosystem resource characteristics and function(s) at a site where they have ceased to exist, or where they exist in a substantially degraded state, and that renders a positive biological response by the species or habitat.

Reversal: Credit project that does not persist for the full, required, duration due to natural or man-made causes.[27]

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[27] USFWS DRAFT GRSG Mitigation Framework Glossary revised

Safe Harbor Agreement (SHA): Formal agreement between the USFWS or NMFS and one or more non-Federal landowners in which landowners voluntarily manage land for listed species for an agreed amount of time providing a net conservation benefit to the species at the end of the time period and, in return, receive assurances from the Federal agency that no additional future regulatory restrictions will be imposed.[28]

Science Committee: The group of species and ecology experts appointed by the Sagebrush Ecosystem Council and are responsible for analyzing the best-available species and ecological science and making adaptive management recommendations.

Service Area: The geographic area within which habitat credit trading occurs, as defined by the current SGMA; the geographic area within which impacts to covered species' habitat can be offset at a particular habitat offset site as designated in an agreement or program.[29]

Site Scale (4th order): 4th order selection is based on sage-grouse selection for vegetation structure and composition that provide for their daily needs, including forage and cover.

Split Estate: Surface rights and subsurface rights (such as the rights to develop minerals) for a piece of land are owned by different parties.[30]

Stacking Payments and Credits: The creation of different credit types or payments on the same project site. Stacking credits allows Credit Developer to market multiple ecological values, and also allows payments from federal programs to be paired with payments from private sector mitigation markets for different services on the same land.

Static offset: Mitigation achieved for a debit project by the use of single credit project produced for the duration of the relevant debit project.

Stewardship: Maintenance of high quality habitat currently used by or in close proximity to habitat used by greater sage-grouse, or manipulation of existing habitat to increase specific habitat functionality. Examples range from placing a conservation easement on existing high quality habitat and committing to maintaining that high quality for the full duration of the credit project to improvement of habitat quality, as measured through functional HQT scores, through a prescribed grazing plan on existing rangeland.

Technical Support Provider: Entities with technical expertise in conservation planning and project design, who understand how to use the Credit System tools and forms. May be hired by Credit Developers to help design credit projects, use the HQT to estimate credits, and submit all required materials to the Administrator. There is no formal process to designate or certify a Technical Support Providers as qualified.

Transfer: The transfer of credits between account, such as between the account of a Credit Developer and Credit Buyer, or a Credit Developer and the reserve account. After transfer of credits between the accounts of a Credit Developer and a Credit Buyer, the Credit Developer is responsible for meeting the monitoring, reporting and verification requirements of each project for the life of the project (described in Step D3 in Section 3).

Verification: An independent, expert check on the HQT calculations and other specifications of the Credit System. The purpose of verification is to provide confidence to all participants, including the

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[28] USFWS DRAFT GRSG Mitigation Framework Glossary

[29] USFWS DRAFT GRSG Mitigation Framework Glossary

[30] USFWS DRAFT GRSG Mitigation Framework Glossary

Administrator, that credit and debit calculations represent a faithful, true and fair account of conditions on-the-ground.

Verifier: A person that conducts site visits to assess the accuracy of credit and debit calculations. Verifiers must be trained and certified by the Administrator and must meet qualifications established by the Oversight Committee.

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APPENDIX B: TOOLS, FORMS & TEMPLATES

The following tools, forms and templates with associated instructions are referenced in the Credit System Manual and help to support ongoing operations of the Nevada Conservation Credit System (Credit System). The Tools, Forms & Templates Table describes these products, including the officially approved version that should be used in association with the current version of the Credit System Manual.

- **Tool**: A document, spreadsheet, or website used by Credit Developers, Credit Buyers or the Administrator to carry out a particular operational step in the Credit System Manual. For example, the Habitat Quantification Tool (HQT) is used to determine credit and debit from project sites. Tools are maintained by the Administrator.
- **Form**: A document with pre-defined fields that participants fill out and submit to the Administrator. For example, the Validation Checklist provides a set of fields that Credit Developers fill out to provide basic information to the Administrator about a proposed credit project.
- **Template**: A document with defined content outline and formats that a Credit System participant uses to efficiently populate with unique information. For example, the Administrator uses the previous year's Annual Performance Report to update information and create the next year's Annual Performance Report.

The Tools, Forms & Templates Table uses the following fields to define each product.

- **Name & Version**: Name of the document and the currently approved version for use by participants in the Credit System.
- **Type:** Specifies whether the document is a tool, form, or template as described above.
- **Description**: A brief description of the purpose of each document.
- **Related Step(s)**: Related steps where the document is referenced in the *Section 3: Credit System Operations*.
- **Responsible Party**: Specifies which party is responsible for using a tool, filling out a form, or creating a product from a template.

[The tools, forms and templates in the following table will be built out over the coming months including specific supporting guidance. The only exception is the Habitat Quantification Tool, which a draft has been released along with the Manual.]

#	name & Version	Type	Description	Related Step(s)	Responsible Party
1	**VALIDATION CHECKLIST** (VERSION - TBD)	Form	Basic information to provide an initial screen of a credit project's eligibility to participate in the Credit System.	D1.3	Credit Developer
2	**LIST OF CREDIT OPPORTUNITIES** (VERSION – TBD)	Template	List of credit projects seeking funding and Credit Buyers interested in purchasing credits.	D1.4, B1.1	Administrator
3	**HABITAT QUANTIFICATION TOOL (HQT)** (VERSION – TBD)	Tool	A set of metrics (i.e. measurements and methods), applied at multiple spatial scales, to evaluate vegetation, anthropogenic, and environmental conditions related to habitat quality and quantity.	D2, B2.2	Credit Developer, Buyer

#	name & Version	Type	Description	Related Step(s)	Responsible Party
4	**CREDIT ESTIMATE FORM** (VERSION – TBD)	Form	Records and documents the results of HQT outputs including: ▪ Pre-project site condition. ▪ Credits projected to be achieved on site under the proposed restoration or management plan. ▪ Description of conservation threats.	D2.2, D2.3	Credit Developer
5	**MANAGEMENT PLAN** (VERSION – TBD)	Template	Template that guides a Credit Developer to define specific restoration and management actions over the life of a credit project, including ongoing maintenance and monitoring requirements. ▪ Existing project site information, such as a site map and information on current management practices. ▪ Management plan information, including proposed management or restoration practices, anticipated start and end dates, and any management limitations.	D2.3	Credit Developer
6	**VERIFICATION CONTRACT** (VERSION – TBD)	Form	A Credit Developer or Buyer signs a contract with the Administrator for third-party verification of a credit or debit site.	D3.1, B2.2	Credit Developer, Buyer
7	**CONFLICT OF INTEREST FORM** (VERSION – TBD)	Form	Submitted by a Verifier to the Administrator about any pre-existing conflicts of interest for verification.	D3.1, B2.2	Verifier
8	**VERIFICATION REPORT** VERSION – TBD)	Template	Report submitted by a Verifier after site verification attesting to his or her opinion on whether a Credit Developer's Credit Estimate Report matches on-the-ground conditions, or a Buyer's baseline measurement.	D3.3, B2.2	Verifier
9	**SELF-MONITORING REPORT** (VERSION – TBD)	Template	Report submitted by Credit Developers in non-verification years demonstrating that specifications of the Management Plan have been fulfilled.	D3.3, B2.2	Credit Developer
10	**CREDIT OBLIGATION FORM** (VERSION – TBD)	Form	Form submitted to the Administrator outlining to total credit obligation of a mitigation buyer, including the total debit multiplied by the appropriate mitigation ratio.	B2.2	Buyer
11	**VERIFICATION PROTOCOL** (VERSION – TBD)	Tool	The step-by step description of the verification process for Verifiers to use as guidance.	D3.3, B2.2	Administrator
12	**NOTICE OF CREDIT TRANSFER** (VERSION – TBD)	Form	Notice from the Credit Developer or Buyer to direct the Administrator to transfer credits between accounts.	D5.1, D5.2, B3.2	Credit Developer, Buyer

#	name & Version	Type	Description	Related Step(s)	Responsible Party
13	**ACCOMPLISHMENT REPORTS** (VERSION – TBD)	Template	Reports provided by the Administrator to Credit Developers and Credit Buyers outlining project accomplishments.	D5.3, B4.2	Administrator
14	**CREDIT SYSTEM IMPROVEMENTS LIST** (VERSION – TBD)	Template	Suggestions for improving the Credit System collected throughout the year and maintained by the Administrator.	A1.1	Administrator
15	**LIST OF RESEARCH NEEDS** (VERSION – TBD)	Template	Catalogs and prioritizes research and monitoring needs identified by participants.	A2.1	Administrator
16	**CREDIT SYSTEM PERFORMANCE REPORT** (VERSION – TBD)	Template	The Administrator generates quantitative information to show Credit System accomplishments with respect to overall goals.	A3.1	Administrator
17	**SYNTHESIS OF FINDINGS REPORT** (VERSION – TBD)	Template	Synthesizes learning from experience implementing the Credit System and from new monitoring and research findings	A4.1	Administrator
18	**CREDIT SYSTEM IMPROVEMENT RECOMMENDATIONS MEMO** (VERSION – TBD)	Template	Recommendations of priority Credit System improvements for approval by the Oversight Committee	A5.1	Administrator
19	**RECORD OF DECISIONS** (VERSION – TBD)	Template	Defines the agreed-to changes, rationale, the party responsible for implementing changes, and the date changes go into effect.	A5.2	Administrator
20	**AUDIT REPORT** (VERSION – TBD)	Template	Independent audit of the Credit System operations by the Oversight Committee or third-party.	A5.3	Oversight Committee

SIERRA FRONT-NORTHWESTERN GREAT BASIN AREA	**NORTHEASTERN GREAT BASIN AREA**	**Mojave-Southern Great Basin Area**
STANDARD 1. SOILS: Soil processes will be appropriate to soil types, climate and land form. As indicated by: - Surface litter is appropriate to the potential of the site; - Soil crusting formations in shrub interspaces, and soil compaction are minimal or not in evidence, allowing for appropriate infiltration of water; - Hydrologic cycle, nutrient cycle and energy flow are adequate for the vegetative communities; - Plant communities are diverse and vigorous, and there is evidence of recruitment; and - Basal and canopy cover (vegetative) is appropriate for site potential.	**STANDARD 1. UPLAND SITES:** Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and land form. As indicated by: Indicators are canopy and ground cover, including litter, live vegetation and rock, appropriate to the potential of the site.	**STANDARD 1. SOILS:** Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle. Soil indicators: - Ground cover (vegetation, litter, rock, bare ground); - Surfaces (e.g., biological crusts, pavement); and - Compaction/infiltration. Riparian soil indicators: - Stream bank stability. All of the above indicators are appropriate to the potential of the ecological site.
GUIDELINES 4. After a range fire or other natural catastrophic event, vegetation should be returned to the native species as rapidly as possible, to afford forage and habitat for native animals. If a nurse crop is needed to **protect the land from erosion**, all native nurse crops should be used first. 5. Treated areas will be rested from livestock grazing for two growing seasons or until seedlings are established or the vegetative response has achieved objective levels. Wild horse and burros removed from Herd Management Areas will be restored after rehabilitation objectives have been met. 6. Alternative solutions (e.g., reseeding, funding, labor, equipment use or rental) to facilitate fire rehabilitation may	**GUIDELINES** 1.1 Livestock grazing management and wild horse and burro population levels are appropriate when in combination with other multiple uses they maintain or promote upland vegetation and other organisms and provide for infiltration and permeability rates, soil moisture storage, and soil stability appropriate to the ecological site within management units. 1.2 When livestock grazing management and wild horse and burro herd management alone are not likely to restore areas of low infiltration or permeability, land management treatments should be designed and implemented where appropriate. 1.3 Livestock grazing management and wild horse and burro herd management are	**GUIDELINES** 1.1 Upland management practices should maintain or promote adequate vegetative ground cover to achieve the standard. 1.2 Riparian-wetland management practices should maintain or promote sufficient residual vegetation to maintain, improve, or restore functions such as stream flow energy dissipation, sediment capture, groundwater recharge, and streambank stability. 1.3 When proper grazing practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate. 1.4 Rangeland management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time

be included in cooperative agreements involving qualified groups and individuals who want to participate. 7. Appropriate livestock grazing treatments will be implemented to control the frequency, duration, and level of grazing use. Where livestock grazing is authorized, grazing systems will provide within any one grazing year one or more of the following treatments: a. Rest or deferment from livestock grazing on a specified area as appropriate to meet Standards. b. Systematic rotation of deferred use and/or rest from livestock grazing among two or more units. c. Continuous, season-long use where it has been demonstrated to be consistent with achieving identified Standards. Once season long use is determined to be unacceptable, an alternative system will be developed and implemented before termination of season long use, prior to the next grazing season. d. Excluding further livestock grazing within the affected use area through appropriate techniques when utilization objectives are reached. 11. Encourage the use of prescribed and natural fires, meeting prescription objectives, for the restoration and maintenance of healthy rangelands. 12. Departure from traditional grazing management practices may be authorized by BLM to	adequate when significant progress is being made toward this standard. See Appendix C (a) for additional guidelines for vegetation management.	necessary for predicting trends.

achieve Standards on a case by case experimental basis for rangeland restoration and rehabilitation. 13. The best available science and technology will be utilized in monitoring and assessing the condition of rangelands from the pasture to the BLM District level. 18. Implement aggressive action to reduce the invasion of exotic plant species into native plant communities. Control the spread of noxious weeds through various methods such as, grazing management, fire management and other vegetative management practices. 20. The utilization, monitoring and evaluation process will be used as a tool to promote healthy rangelands and achieve Standards.		
STANDARD 2. RIPARIAN/WETLANDS: Riparian/Wetland systems are in properly functioning condition. As indicated by: - Sinuosity, width/depth ratio and gradient are adequate to dissipate streamflow without excessive erosion or deposition; - Riparian vegetation is adequate to dissipate high flow energy and protect banks from excessive erosion; and - Plant species diversity is appropriate to riparian-wetland systems.	**STANDARD 2. RIPARIAN AND WETLAND SITES:** Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria. As indicated by: Stream side riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows. Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics: Width/Depth ratio; Channel roughness; Sinuosity of stream	**STANDARD 2. ECOSYSTEM COMPONENTS:** Watersheds should possess the necessary ecological components to achieve state water quality criteria, maintain ecological processes, and sustain appropriate uses. Riparian and wetlands vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function). **Upland Indicators:** - Canopy and ground cover, including litter, live vegetation, biological crust, and rock appropriate to the potential of the ecological site. - Ecological processes are adequate for the vegetative communities. **Riparian Indicators:**

	channel; Bank stability; Vegetative cover (amount, spacing, life form); and Other cover (large woody debris, rock). Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.	- Stream side riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows. - Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics: - Width/Depth ratio; - Channel roughness; - Sinuosity of stream channel; - Bank stability; - Vegetative cover (amount, spacing, life form); and - Other cover (large woody debris, rock). - Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics. The above indicators shall be applied to the potential of the ecological site.
GUIDELINES 3. Management practices within allotments will maintain or promote stream channel morphology, appropriate soil organisms; adequate amounts of ground cover to support infiltration, maintain soil moisture storage, and stabilize soils; and the hydrologic cycle, nutrient cycle and energy flow. 9. Salt and/or supplements will be placed at least ¼ mile from live waters (springs/streams) and outside of associated riparian areas, permanent livestock	**GUIDELINES** 2.1 Livestock grazing management and wild horse and burro population levels will maintain or promote sufficient vegetation cover, large woody debris, or rock to achieve proper functioning condition in riparian and wetland areas. Supporting the processes of energy dissipation, sediment capture, groundwater recharge, and stream bank stability will thus promote stream channel morphology (e.g., width/depth ratio, channel roughness, and sinuosity) appropriate to climate, landform,	**GUIDELINES:** 2.1 Management practices should maintain or promote appropriate stream channel morphology and structure consistent with the watershed. 2.2 Watershed management practices should maintain, restore or enhance water quality and flow rate to support desired ecological conditions. 2.3 Management practices should maintain or promote the physical and biological conditions necessary for achieving surface characteristics and

watering facilities, wet or dry meadows, and aspen stands. Also salt should not be placed in known historic properties. 10. Night bedding of sheep will be located at least ¼ mile from live waters, streams, springs, seeps, associated riparian areas, wet or dry meadows, and aspen stands. 16. The development of springs and seeps or other projects affecting water and associated resources shall be designed to maintain the associated riparian area and assure the attainment of Standards. 19. Riparian structural developments (i.e., gabions, dams, etc.) designed to achieve improvement in riparian and wetland conditions shall only be implemented in conjunction with changes in existing grazing management practices, where grazing is a significant factor contributing to a riparian condition needing such attention. Where grazing is not a significant factor causing a riparian condition needing attention, structural developments designed to achieve improvement in riparian and wetland conditions may be implemented independent of changes in existing grazing management practices.	gradient, and erosional history. 2.2 Where livestock grazing management and wild horse and burro herd management are not likely to restore riparian and wetland sites, land management treatments should be designed and implemented where appropriate to the site. 2.3 Livestock grazing management and wild horse and burro herd management will maintain, restore or enhance water quality and ensure the attainment of water quality that meets or exceeds state standards. 2.4 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this standard. See Appendix c(a) for additional guidelines for vegetation management	desired natural plant community. 2.4 Grazing management practices will consider both economic and physical environment, and will address all multiple uses including, but not limited to, (i) recreation, (ii) minerals, (iii) cultural resources and values, and (iv) designated wilderness and wilderness study areas. 2.5 New livestock facilities will be located away from riparian and wetland areas if they conflict with achieving or maintaining riparian and wetland functions. Existing facilities will be used in a way that does not conflict with achieving or maintaining riparian and wetland functions, or they will be relocated or modified when necessary to mitigate adverse impacts on riparian and wetland functions. The location, relocation, design and use of livestock facilities will consider economic feasibility and benefits to be gained for management of lands outside the riparian area along with the effects on riparian functions. 2.6 Subject to all valid existing rights, the design of spring and seep developments shall include provisions to protect ecological functions and processes. 2.7 When proper grazing practices alone are not likely to restore areas of low infiltration or permeability, land management practices may be designed and implemented where appropriate. Grazing on designated ephemeral rangeland watersheds should be allowed only if (i) reliable estimates of production have been made, (ii) an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and (iii) adverse effects on perennial species

		and ecosystem processes are avoided. 2.8 Rangeland management practices should address improvement beyond these standards, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.
STANDARD 4. PLANT AND ANIMAL HABITAT: Populations and communities of native plant species and habitats for native animal species are healthy, productive and diverse. As indicated by: - Good representation of life forms and numbers of species; - Good diversity of height, size, and distribution of plants; - Number of wood stalks, seed stalks, and seed production adequate for stand maintenance; and - Vegetative mosaic, vegetative corridors for wildlife, and minimal habitat fragmentation. **STANDARD 5. SPECIAL STATUS SPECIES HABITAT:** Habitat conditions meet the life cycle requirements of special status species. As indicated by: - Habitat areas are large enough to support viable populations of special status species; - Special status plant and animal numbers and ages appear to ensure stable populations; - Good diversity of height, size,	**STANDARD 3. HABITAT:** Habitats exhibit a healthy, productive, and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species. As indicated by: Vegetation composition (relative abundance of species); Vegetation structure (life forms, cover, heights, or age classes) Vegetation distribution (patchiness, corridors); Vegetation productivity; Vegetation nutritional value.	**STANDARD 3. HABITAT AND BIOTA:** Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species. Habitat Indicators: - Vegetation composition (relative abundance of species); - Vegetation structure (life forms, cover, height, and age classes); - Vegetation distribution (patchiness, corridors); - Vegetation productivity; and - Vegetation nutritional value. **Wildlife Indicators:** - Escape terrain; - Relative abundance; - Composition; - Distribution; - Nutritional value; and - Edge-patch snags. The above indicators shall be applied to the potential of the ecological site.

and distribution of plants; - Number of wood stalks, seed stalks, and seed production adequate for stand maintenance; and - Vegetative mosaic, vegetative corridors for wildlife, and minimal habitat fragmentation.		
GUIDELINES 4. After a range fire or other natural catastrophic event, vegetation should be returned to the native species as rapidly as possible, to **afford forage and habitat for native animals**. If a nurse crop is needed to protect the land from erosion, all native nurse crops should be used first. 8. Conservation of Federal threatened or endangered, proposed, species of concern (formally Category One and Two) and other special status species is promoted by the restoration and maintenance of their habitats. 14. Recognizing State Water Law requirements, wildlife and wild horses/burros within their Herd Management Areas will have access to surface water they customarily use. 15. Design of water facilities will incorporate features to ensure safe access and escape for small animals and birds. 17. Grazing management practices shall be planned and implemented to allow for habitat requirements of wildlife and wild horses and burros within Herd Management Areas. 21. Implement grazing management practices that sustain	**GUIDELINES** 3.1 Livestock grazing management and wild horse and burro population levels will promote the conservation, restoration and maintenance of habitat for threatened and endangered species, and other special status species as may be appropriate. 3.2 Livestock grazing intensity, frequency, season of use and distribution and wild horse and burro population levels should provide for growth and reproduction of those plant species needed to reach long-term land use plan objectives. Measurements of ecological condition and trend/utilization will be in accordance with techniques identified in the Nevada Rangeland Monitoring Handbook. 3.3 Livestock grazing management and wild horse and burro management should be planned and implemented to allow for integrated use by domestic livestock, wildlife, and wild horses and burros consistent with land use plan objectives. 3.4 Where livestock grazing management and wild horse and burro herd management alone are not likely to achieve habitat objectives, land treatments may	**GUIDELINES** 3.1 Mosaics of plant and animal communities that foster diverse and productive ecosystems should be maintained or achieved. 3.2 Management practices should emphasize native species except when others would serve better for attaining desired communities. 3.3 Intensity, frequency, season of use and distribution of grazing use should provide for growth, reproduction, and when environmental conditions permit, seedling establishment of those plant species needed to reach long-term land use plan objectives. Measurements of ecological condition, trend, and utilization will be in accordance with techniques identified in the Nevada Rangeland Handbook. 3.4 Grazing management practices should be planned and implemented to provide for integrated use by domestic livestock and wildlife, as well as wild horses and burros inside Herd Management Areas (HMAs). 3.5 Management practices will promote the conservation, restoration and maintenance of habitat for special status species. 3.6 Livestock grazing practices will be designed to protect fragile ecosystems of limited distribution and size that support unique

biological diversity across the landscape. 22. To prevent transmission of disease between domestic and bighorn sheep, adopt and implement the "Guidelines for Domestic Sheep Management in Bighorn Sheep Habitats" contained in Mountain Sheep Ecosystem Management Strategy in the 11 Western States and Alaska.	be designed and implemented as appropriate. 3.5 When native plant species adapted to the site are available in sufficient quantities, and it is economically and biologically feasible to establish or increase them to meet management objectives, they will be emphasized over non-native species. 3.6 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this Standard. See Appendix C (a) for additional guidelines for vegetation management.	sensitive/endemic species or communities. Where these practices are not successful, grazing will be excluded from these areas. 3.7 Where grazing practices alone are not likely to achieve habitat objectives, land management practices may be designed and implemented as appropriate. 3.8 Vegetation manipulation treatments may be implemented to improve native plant communities, consistent with appropriate land use plans, in areas where identified standards cannot be achieved through proper grazing management practices alone. Fire is the preferred vegetation manipulation practice on B. (1) The combined aerial parts of plants and cannot be achieved through proper grazing management practices alone. Fire is the preferred vegetation manipulation practice on areas historically adapted to fire; treatment of native vegetation with herbicides or through mechanical means will be used only when other management techniques are not effective. 3.9 Rangeland management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.
STANDARD 3. WATER QUALITY: Water quality criteria in Nevada or California State Law shall be achieved or maintained. As indicated by:	**ORIGINALLY IN STANDARD 2 ABOVE:** Chemical, physical and biological water constituents are not exceeding the state water quality standards	**ORIGINALLY IN STANDARD 2 ABOVE:** **Water Quality Indicators:** - Chemical, physical and biological constituents do not exceed the state water quality standards. The above indicators shall be applied

- Chemical constituents do not exceed the water quality Standards; - Physical constituents do not exceed the water quality Standards; - Biological constituents do not exceed the water quality Standards; and - The water quality of all water bodies, including ground water located on or influenced by BLM lands will meet or exceed the applicable Nevada or California water quality Standards. Water quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law, and as found in Section 303(c) of the Clean Water Act. **GUIDELINES** 1. Waters must be free from high temperature, biocides, organisms pathogenic to human beings, toxic, corrosive or other deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or combinations to interfere with any beneficial use of the water. Compliance with the provisions of this subsection may be determined in accordance with methods of testing prescribed by the State. If used as an Indicator, survival of test organisms must not be significantly less in test water than in control water. 2. Grazing management practices should be planned and		to the potential of the ecological site.

implemented to meet water quality provisions in either California State water law or Nevada Administrative Code Section 445A.120-121 as applicable.		
NO SIMILAR STANDARD **GUIDELINE** 23. Rangeland management plans will consider listings of known historic properties and new eligible properties as they become known.	**STANDARD 4. CULTURAL RESOURCES**: Land use plans will recognize cultural resources within the context of multiple use. **GUIDELINES:** 4.1 Rangeland management plans will consider listings of known sites that are National Historic Register eligible or considered to be of cultural significance and new eligible sites as they become known. 4.2 Wild horse and burro herd management will be designed to avoid or mitigate damage to significant cultural resources	**NO SIMILAR STANDARD**
NO SIMILAR STANDARD	**STANDARD 5. HEALTHY WILD HORSE AND BURRO POPULATIONS**: Wild horses and burros exhibit characteristics of a healthy, productive, and diverse population. Age structure and sex ratios are appropriate to maintain the long term viability of the population as a distinct group. Herd management areas are able to provide suitable feed, water, cover and living space for wild horses and burros and maintain historic patterns of habitat use. As indicated by:	**NO SIMILAR STANDARD**

	Healthy rangelands that provide sufficient quantities and quality of forage and water to sustain the appropriate management level on a year long basis within a herd management area. Wild horses and/or burros managed on a year-long basis for a condition class greater than or equal to five to allow them normal chances for survival in the winter (See glossary for equine body conditioning definitions). Highly adoptable wild horses and burros that are readily available from herd management areas. Wild horse and burro herds that exhibit appropriate age structure and sex ratio for short and long term genetic and reproductive health **GUIDELINES:** 5.1 Implement the objectives outlined in the Wild Free-Roaming Horses and Burros Tactical Plan for Nevada (May 1999). 5.2 Manage for wild horses and/or burros in herd management areas based on the capability of the HMA to provide suitable feed, water, cover and living space for all multiple uses. 5.3 Set appropriate Management Levels based on the most limiting habitat factor (eg. available water, suitable forage, living space and cover) in the context of multiple use. 5.4 Manage herd management area populations to preserve and enhance physical and biological characteristics that are of	

	historical significance to the herd. 5.5 Manage wild horse and burro herds for short and long term increases and to enhance adoptability by ensuring that wild horses and burros displaying desirable traits are preserved in the herd thus providing a reproductive base to increase highly adoptable horses and burros for future demands. 5.6 Identify and preserve historic traits and characteristics within the herd which have proven to be highly desirable by the adoption public to increase the long term availability of animals bearing these features. 5.7 Wild horse and burro selective removal criteria are modified on a per herd basis to correct deficiencies in population age and sex ratios which threaten short and long term genetic diversity and reproductive health.	

NE NEVADA APPENDIX

Other RACs do not have this!

VEGETATION GUIDELINES

The Nevada Northeastern Great Basin Resource Advisory Council (RAC), as chartered by the Department of the Interior, has developed Guidelines for Vegetation Management on about 16.2 million acres of public lands administered by the Bureau of Land Management within the designated geographic area of the Northeastern Great Basin within the State of Nevada.

These Vegetation Management Guidelines are intended to serve as a supplement to the Standards and Guidelines for Rangeland Health which were adopted in 1997 and later expanded to include Wild Horse and Burro Standards and Guidelines in 2000. These recommended Standards and Guidelines reflect the stated goal of improving rangeland health in the Northeastern Great Basin.

NON-INDIGENOUS ANNUAL GRASSLANDS
DEFINITIONS:

Cheatgrass/Annual Grass Monoculture: Areas dominated by cheatgrass or other non-indigenous annual grass species that have crossed a threshold and lost the ability to recover naturally due to lack of perennial species.

Cheatgrass/Annual Grass Dominant: Recently burned areas having native perennial species present with potential for natural recovery with appropriate management of non-indigenous annual grasses.

Cheatgrass/Annual Grass Infested: Shrub dominated communities with a limited understory of native perennial species, but a significant amount of annual grasses, exhibiting a high potential to be converted to non-indigenous annual grass dominated ranges.

Desired Conditions: Communities will exhibit or be progressing toward a healthy, productive, diverse population of native and or desirable plant species, and functioning disturbance processes appropriate to the site characteristics.

Guidelines Common to All:

1) Encourage research and field trials in all non-indigenous annual grass ranges to determine effectiveness of control on recovery and rehabilitation efforts in perennial plant communities.
2) Non-indigenous annual grass monoculture and dominated ranges must follow a successional process from annual/perennial grass mix to a shrub/grass community. Large scale seeding of shrubs should be discouraged, and small scale (islands), of intensively managed shrub seedings/transplants encouraged.

Guidelines for Cheatgrass/Annual Monoculture:

1) Break up the monoculture through the use of chemical, biological, and/or mechanical means to stop the spread of the effected area especially in areas that border critical habitat. Use native and non-native desirable species known to be fire tolerant and resistant during the late summer fire season.
2) Use the best available information to determine the most effective processes to break up the monoculture, reduce the cheatgrass seed bank, and restore native plant communities.

Guidelines for Cheatgrass Dominant and Cheatgrass infested ranges:

1) Encourage innovative approaches to control cheatgrass, such as, strategically controlled grazing and the use of prescribed fire to favor production of perennial species.
2) Seed areas with perennial grass species to reduce the dominance of cheatgrass.

Strategies:

1) Management practices to maintain healthy ecological sites should include: prescribed fire, prescribed natural fire, mechanical manipulations, specialized prescription herbivory, chemical treatments, re-seeding, or combinations of treatments.

2) Special emphasis must be placed on management activities where public safety at wildland-urban interfaces is jeopardized.

SALT DESERT SHRUBLANDS

DEFINITION: Plant communities dominated by members of the Chenopodiaceae family including: shadscale, four-wing saltbush, black and Bailey greasewoods, spiny hopsage, and white sage; with an understory including ricegrass, squirreltail, saltgrass, and other saline tolerant species.
Desired Conditions: Communities will exhibit or be progressing toward a healthy, productive, diverse population of native and or desirable plant species, and functioning disturbance processes appropriate to the site characteristics.

Guidelines:

1) Grazing should generally be limited to very early season or dormant season rather than year round. If very early season grazing is permitted or prescribed to control cheatgrass early in the spring, grazing should be terminated early enough to allow perennial plant species to set seed.
2) After disturbance such as fire, insect infestation, and periods of less than desirable grazing management, considers resting communities for an appropriate amount of time relative to moisture conditions.
3) All management and revegetation strategies must consider current site conditions and associated thresholds (i.e., current status in state-and-transition model appropriate for the site). In addition, factors such as ecological site, presence of undesirable species (e.g., invasive or noxious species), adjacent plant communities, current use or management status, and position in the watershed must be considered prior treatment application.
4) Encourage research and field trials in salt desert shrub communities to determine the best effective methods of restoration.

Strategies:

1) Management practices to maintain healthy ecological sites should include: prescribed fire, prescribed natural fire, mechanical manipulations, specialized prescription herbivory, chemical treatments, re-seeding, or combinations of treatments.
2) Special emphasis must be placed on management activities where public safety at wildland-urban interfaces is jeopardized.

SAGEBRUSH/BUNCHGRASS RANGELANDS

DEFINITIONS: Plant communities dominated by one or more members of the Artemisia genus including Wyoming big sagebrush, low sagebrush, basin sagebrush, black sagebrush, Lahontan sagebrush, and mountain sagebrush. Herbaceous understory is dominated by perennial grasses but includes a component of annual and perennial forbs. Other shrubs may also be present.
Desired Conditions: Communities will exhibit or be progressing toward a healthy, productive, diverse population of native and or desirable plant species, and functioning disturbance processes appropriate to the site characteristics.

Guidelines:

1) Create and maintain a diversity of sagebrush age and cover classes on the landscape through the use of prescribed fire, prescribed natural fire, mechanical, biological, and/or chemical means to provide a variety of habitats and productivity conditions.
2) Vegetation treatments should be of appropriate size to meet land management objectives. Where possible, inclusions of intact sagebrush should be left scattered within the treated area or in relatively close proximity to provide a seed source for recruitment. Distribution of residual plants will determine in part, the time period required for the successional process to proceed toward sagebrush recolonization.
3) All treatments must consider current site conditions and associated thresholds (i.e., current status in state-and-transition model appropriate for the site). In addition, factors such as ecological site, presence of undesirable species (e.g., invasive or noxious species), adjacent plant communities, current use or management status, and position in the watershed must be considered prior to treatment application.
4) Where initial condition has a depleted herbaceous understory, vegetation treatment should include seeding with desirable species suited or adapted to site conditions. Seeding methods and dates should be appropriate to the plant materials and site conditions.
5) Where a mosaic of age and cover classes already exists, maintain landscape diversity through fuels management and periodic disturbance. Recognize the system is dynamic, and suitability of the plant

community for any given specie or group of species will change over time. Maintenance of diverse habitat conditions will provide a continuous suite of seasonal habitats over time.
6) Where pinyon pine and/or juniper trees have encroached into sagebrush communities, use best management practices to remove trees and re-establish understory species.

Strategies:

1) Management practices to maintain healthy ecological sites should include: prescribed fire, prescribed natural fire, mechanical manipulations, specialized prescription herbivory, chemical treatments, re-seeding, or combinations of treatments.
2) Special emphasis must be placed on management activities where public safety at wildland-urban interfaces is jeopardized.

NOXIOUS WEEDS

DEFINITIONS:
Noxious weed monoculture: Areas that have lost the ability to recover naturally due to lack of native perennial species.
Noxious weed dominant: Areas having native perennial species present with potential for natural recovery if noxious weeds are controlled.
Noxious weed infested: Plant communities with a limited understory of perennial species and a high potential to be converted to noxious weed dominant.

Desired Conditions: Communities will exhibit or be progressing toward a healthy, productive, diverse population of native and or desirable plant species, and functioning disturbance processes appropriate to the site characteristics.

Guidelines Common to All:

1) Encourage research and field trials in all noxious weed rangelands to determine effectiveness of noxious weed control in the recovery process of restoring perennial plant communities.
2) Noxious weed monoculture and noxious weed dominant ranges must follow a successional process from grass/grass mix to a shrub community. Use best management practices to return site to best approximation of site potential.

Guidelines for Noxious Weed Monoculture:

1) Break up monoculture using an Integrated Weed Management approach that combines chemical, biological, and/or mechanical means to reduce spread of affected area, especially in areas that border critical habitat or other sensitive sites. Treatment regime should be based on ecology and phenology of the noxious species.
2) Use best available information to determine the most effective process to break up continuity and rehabilitate native plant communities, recognizing that beneficial, introduced species may provide excellent interim benefits.

Guidelines for Noxious Weed Dominant and Infested Rangelands:

1) Encourage practices to eliminate new noxious species entry and limit current infestations to existing levels.
2) Utilize an Integrated Weed Management approach, that consists of chemical, biological, and/or mechanical means to control noxious species.
3) Encourage innovative approaches to control noxious species, such as strategically controlled grazing and use of prescribed and prescribed natural fire to favor production of native perennial species.
4) Seed areas with perennial species to reduce dominance of noxious species.

PINYON-JUNIPER WOODLANDS

Definition: Plant communities dominated by one or both species of Utah juniper and/or single leaf pinyon pine. Pinyon pine generally dominates at higher and juniper at lower elevations. Herbaceous understory is dominated by perennial grasses but includes a component of annual and perennial forbs. Shrubs may also be present. In the past, woodlands were generally restricted to sites with very low fire frequency such as rocky ridges and steep slopes with little soil development.

Desired Conditions: Woodland communities will exhibit or be progressing toward a healthy, productive, diverse population of native and or desirable plant species, and functioning disturbance processes appropriate to the site characteristics. Healthy, sustainable pinyon and juniper woodlands will be maintained on appropriate soil types as identified by Natural Resource Conservation Service soil surveys within appropriate Major Land Resource Areas (MLRAs).

Guidelines:

1) Woodlands will exhibit a combination of successional stages based on differing pinyon and juniper species composition, age structure, and understory composition appropriate to site characteristics on a watershed, or portion of a watershed.

2) Woodlands will be separated from other ecological sites by an ecotone interface zone, rather than a well-defined edge. Woodlands should not encroach outside of soil sites correlated with woodland communities.

3) Woodland stand structure should not, under normal conditions support catastrophic, stand replacing fires. Community species composition and proportionalities should follow Natural Resource Conservation guidelines appropriate to the site.

4) All management and revegetation strategies must consider current site conditions and associated thresholds (i.e., current status in state-and-transition model appropriate for the site). In addition, factors such as ecological site, presence of undesirable species (e.g., invasive or noxious species), adjacent plant communities, current use or management status, and position in the watershed must be considered prior treatment application.

Strategies:

1) Management practices to maintain healthy woodlands should include: prescribed fire, prescribed natural fire, mechanical manipulations, specialized prescription herbivory, chemical treatments, or combinations of treatments.

2) Special emphasis must be placed on management activities where public safety at wildland-urban interfaces is jeopardized.

REHABILITATION AND REVEGETATION STRATEGIES

Re-vegetation includes natural recovery as well as direct management actions.

General Guidelines for Rehabilitation and Revegetation:

1) On burned areas, allow natural regeneration when it is determined that populations of native perennial grasses, forbs, and shrubs are sufficient to re-vegetate the site.

2) Where appropriate, rest rehabilitated and naturally regenerating areas to allow recovery and establishment of perennial plant species based upon objectives and ecological site potential.

3) Determine to what extent re-vegetation success may be site specific and may depend on soil moisture, rainfall, elevation, soil type, slope, aspect, previous vegetative community (ie. native vegetation or cheatgrass prior to a fire), type of seeding, aerial vs. drill seeding etc., seed mixtures, and post seeding management.

4) Use native plant species for rehabilitation except where native species are not available in sufficient quantities; native plant species cannot maintain or achieve the standard; or non-native plant species provide for enhanced protection of native habitats or soil resources.

5) To the extent possible, obtain seeds that are: 1) source identified; or commercial varieties; and meet agency standards.

Note: In emergency situations and with agency approval, seeds may be obtained with lower standards to meet rehabilitation requirements.

6) Establish protocols for pre- and post rehabilitation/restoration monitoring to assist in future evaluation methods. Assemble a team to evaluate multi-district historical data on restoration/rehabilitation projects.

Strategies:

1) On burned areas greater than 1,000 acres, limit sagebrush seeding to no more than 10-20% of the burned area, distributed over no less than 5 locations within the burned area.
2) Enhance sagebrush and other shrub species germination and establishment by utilizing available and appropriate water conservation strategies (e.g., snow fence, surface imprinting, and mulching.
3) On older, large burned areas where previous sagebrush establishment efforts were unsuccessful, interseed sagebrush on areas where perennial grasses have established. Limit seeding to no more than 20% of the area, distributed over no less than 5 locations within the area.
4) Rehabilitation of perennial, introduced grass seedings (e.g., crested wheatgrass) should include grazing treatments at appropriate levels to reduce abundance and competition potential. Reductions can be followed by interseeding with sagebrush as well as native grasses and forbs. Encourage early season grazing and removal to promote seed production and increase native species.
5) Rehabilitation of decadent sagebrush communities should be promoted by using appropriate tools to reduce sagebrush, followed by direct seeding operations. Scale should be appropriate to management objectives.
6) Rehabilitation of pinyon-juniper encroached sagebrush communities should be promoted using appropriate tools to reduce trees, followed by direct seeding operations. Scale should be appropriate to management objectives.

MINED-LAND REVEGETATION GUIDELINES FOR THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION, THE BUREAU OF LAND MANAGEMENT AND THE U.S.D.A. FOREST SERVICE

Reclaimed Desired Plant Communities for Mining Operation Disturbances

Reclamation goals for mining disturbances are 1) stabilize the site, and 2) establish a productive community based on the applicable land use plan and designated post-mining land uses. To meet these goals, a Reclaimed Desired Plant Community (RDPC) should be selected for use on the disturbed mine sites. A RDPC is defined as: A perennial plant community established on a disturbed site which contributes to stability through management and land treatment, and which produces that type and amount of vegetation necessary to meet or exceed both the land use and activity plan objective established for the site.

Several RDPCs may be selected based on site-specific revegetation goals and variable site characteristics for the mining disturbances. When selecting RDPCs, major alterations in reconstructed soils and the subsequent effect of this on the site's capability to establish and sustain the desired vegetation must be considered. A RDPC must have a reasonable chance for success when making the selection.

The plant community for the RDPC should be diverse, and when appropriate for the site should include grasses, forbs, shrubs and/or trees. The RDPC shall be comprised of species native to the area, or introduced species where the need is documented for inclusion to achieve the approved post-mining land use. The RDPC must meet the requirements of applicable State and Federal seed, poisonous and noxious plants, and introduced species laws or regulations. All RDPCs must be approved by the agencies. Plants for RDPCs may be selected using one or more of the following methods:

1. Select existing vegetation types around the mine site to represent the varied RDPCs.
2. Use test plots, demonstration areas, or areas concurrently reclaimed within the mine site or within similar representative areas from adjacent mines to serve as the RDPCs as long as they meet the reclamation goal.
3. For areas where existing vegetative types adjacent to the mine area are severely disturbed or where test plots or demonstration areas are not reasonable alternatives, RDPCs may be selected using appropriate ecological or range site descriptions or other technical sources.

Guidelines for Successful Revegetation

The revegetation release criteria for reclaimed mine sites will be to achieve as close to 100 percent of the perennial plant cover of selected comparison areas as possible. The comparison or reference areas will be selected from representative plant communities adjacent to the mine site, test plots or demonstration areas or, as appropriate, representative ecological or range site descriptions. As approved by the agencies, the selected plant communities or reference areas must have a reasonable chance for success on the mine site. Each plan-of-operations shall identify the site-specific release criteria in the reclamation plan or permit. The agencies may also require specific release standards for individual plant species or vegetative types (grasses, forbs, shrubs, trees). Cover would be estimated using a method as described in Sampling

Vegetation Attributes, Interagency Technical Reference, 1996, BLM/RS/ST-96/002+1730 or other acceptable technical methods.

Tague, Melvin (Joe) <jtague@blm.gov>

GRSG GBR FedFam Mtg - Attachment A

6 messages

Lauren Mermejo <lmermejo@blm.gov> Fri, Sep 5, 2014 at 3:45 PM
To: Joan Suther <jsuther@blm.gov>, "Melvin (Joe) Tague" <jtague@blm.gov>, Quincy Bahr <qfbahr@blm.gov>, Brent Ralston <bralston@blm.gov>

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Lauren

Attachment A-GRSG GBR Fed Family Mtg PDX_2014_08_19-21_Reviewed_Distribute.docx
78K

Melvin (Joe) Tague <jtague@blm.gov> Tue, Sep 9, 2014 at 4:19 PM
To: Randy Sharp <sharphay@att.net>, Holly Prohaska <holly.prohaska@empsi.com>, Arlene Kosic <akosic@blm.gov>, peter.gower@empsi.com

Here are some actions out of the Portland meeting.

From: Lauren Mermejo [mailto:lmermejo@blm.gov]
Sent: Friday, September 05, 2014 12:45 PM
To: Joan Suther; Melvin (Joe) Tague; Quincy Bahr; Brent Ralston
Subject: GRSG GBR FedFam Mtg - Attachment A
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Thanks, Holly

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Asheville Denver Portland Reno San Francisco Santa Fe Washington, DC

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Kosic, Arlene <akosic@blm.gov> Mon, Sep 15, 2014 at 5:12 PM
To: Holly Prohaska <holly.prohaska@empsi.com>
Cc: "Melvin (Joe) Tague" <jtague@blm.gov>, Randy Sharp <sharphay@att.net>, Peter Gower

<peter.gower@empsi.com>

Most say incorporate "as written"-so do we have a choice?

On Mon, Sep 15, 2014 at 1:49 PM, Holly Prohaska <holly.prohaska@empsi.com> wrote:

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> **Sent:** Tuesday, September 09, 2014 1:19 PM
> **To:** Randy Sharp; Holly Prohaska; Arlene Kosic; Peter Gower
> **Subject:** FW: GRSG GBR FedFam Mtg - Attachment A
> **Importance:** High
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Arlene Kosic
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Natural Resource Specialist
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To: Holly Prohaska <holly.prohaska@empsi.com>
Cc: "Melvin (Joe) Tague" <jtague@blm.gov>, Randy Sharp <sharphay@att.net>, Peter Gower <peter.gower@empsi.com>

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Kosic, Arlene <akosic@blm.gov> Thu, Sep 25, 2014 at 1:21 PM
To: Holly Prohaska <holly.prohaska@empsi.com>
Cc: "Melvin (Joe) Tague" <jtague@blm.gov>, Randy Sharp <sharphay@att.net>, Peter Gower <peter.gower@empsi.com>

Sorry for not getting this out sooner. Please see attached.

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80K

ATTACHMENT A:
GREATER SAGE-GROUSE GREAT BASIN FEDERAL FAMILY MEETING - SUMMARY OF OUTCOMES AND ACTION ITEMS

Applicable Sub-regions?	Topic or Resource Program	Outcome and Action	Who?	NV/CA
All	Land Tenure / Retention	The following land retention policy text should be included into the ADPP for land retention and related management actions should be adjusted as appropriate: "Lands classified as priority habitat and general habitat (or habitat classification appropriate for the sub-region) for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands will provide a net conservation benefit to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse."	PMs to incorporate as written into ADPP	Action G-LR-LT 1: Retain public ownership of PPMA and PGMA in compliance with existing acts regarding land disposal. Consider exceptions when: -Disposal and acquisitions of public lands would allow for more contiguous federal ownership patterns within GRSG habitat, or where a land tenure adjustment would result in a net gain in amount or quality of GRSG habitat.
All	Vegetation Management/ Prescribed Fire	Incorporate the following language regarding when fire would be used as a vegetation treatment tool for areas with <12” precip. • Avoid using prescribed fire in Greater Sage-Grouse habitat unless evaluation of site-specific conditions demonstrate that there would be a net benefit for sage-grouse. If prescribed fire is used in Greater Sage-Grouse habitat, include an analysis in the NEPA document that indicates how Greater Sage-Grouse goals and objectives will be addressed and met by its use, why alternative techniques were not selected, and a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. • If prescribed fire is to be used at the implementation level,	Lauren to consolidate language PMs to incorporate	**We do not mention < 12 inch precip. zones** Action G-WFM-HFM 5: If prescribed fire is to be used at the implementation level, at a minimum, the burn plan will indicate how Conservation Objective Team objectives would be addressed and met and why alternative techniques were not selected. Action G-WFM-HFM 6: Prior to using prescribed fire, conduct a fire risk assessment to ensure that

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		at a minimum, the burn plan will indicate how Conservation Objective Team/land use plan objectives would be addressed and met and why alternative techniques were not selected. • Avoid prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush or other xeric sagebrush species, or in areas with a potential for post-fire exotic annual dominance. However, after other treatment opportunities have been explored and as site-specific variables allow, prescribed fire could be used in these areas to meet specific fuels objectives that would maintain, improve, or restore Greater Sage-Grouse habitat in PPMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). • Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and would protect, maintain, increase, or enhance winter range habitat quality.	into ADPP	GRSG goals and objectives are met.
All	Disturbance	All ADPPs should refer to the "disturbance cap" instead of disturbance threshold.	PMs to incorporate into ADPPs	ADPP

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All	Conifers/Veg Management?	Incorporate the following common goal for conifer removal: "Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like VDTT and the FIAT report will help refine the location for specific priority areas to be treated."	PMs to incorporate as written into ADPPs	**This should reflect Table 2-6 as well. I'd prefer to leave it as currently written and not change language.** Action G-VEG-WD 2: Where pinyon and/or juniper trees are encroaching in sagebrush plant communities, design treatments in PPMA and PGMA to focus on enhancing, reestablishing, or maintaining habitat components (e.g., cover, security, and food) in order to achieve GRSG habitat objectives identified in Table 2-6. Focus treatment design on addressing the most limiting habitat component and to decrease conifer encroachment, and increase cover of sagebrush and understory to improve habitat for GRSG and minimize avian predator perches and predation opportunities on GRSG. Action G-VEG-WD 3: On public lands, manage pinyon and/or juniper stands in encroached sagebrush vegetation communities to meet GRSG habitat objectives (Table 2-6). Prioritize Phase I and early Phase II pinyon and/or juniper stands in areas with a sagebrush component and select treatment methods that maintain sagebrush and shrub cover and composition. Only treat habitats in late Phase II or Phase III condition to create movement corridors, connect habitats, or reduce the

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				potential for catastrophic fire. RDF G-VEG-WD 1: Prioritize removal of Phase I and early Phase II standing and encroaching trees within: 3.2 miles (5 kilometers) of leks Out of line of site within 1.86 miles (3 kilometers) of leks
All	Fire	Ensure ADPPs discuss the current authority for temporary closures as a travel management tool to reduce fire ignition risk. "In PPMA and PGMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse	PMs to verify this is discussed in Chapter 2.	ADPP **Exact verbiage already included**

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		effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas."		
All	Fluid Minerals	Exemptions related to fluid minerals - All ADPPs will consider NPT Guidance	PMS	ADPP
All	Consistency	Mitigation team will review buffer sizes between ADPPs to validate the science and provide recommendations for consistent buffers.	Frank/Science Team (USGS)	9/8/14
All	Consistency	Disturbance and Monitoring Sub-team to continue work on disturbance framework striving for a simple formula.	Frank / Vicki / Gordon	9/8/14
All	Consistency	Develop a template for priority management/habitat to PAC crosswalk. This would include a map showing an overlay of priority habitat/management and general habitat/management with the PACs.	Kathy and Matt	9/22/14
All	Clarity	Define loose language (e.g., "if technically and economic feasible…" what is technical feasibility?)	Ed	

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GREATER SAGE-GROUSE GREAT BASIN FEDERAL FAMILY MEETING - SUMMARY OF OUTCOMES AND ACTION ITEMS

Applicable Sub-regions?	Topic or Resource Program	Outcome and Action	Who?	NV/CA
All	Consistency	Grazing management and monitoring is not consistent across plans. • Review rangeland health science (e.g. Connelly vs. Coates). Is it appropriate to cite this current science or reference best available science to allow for flexibility to adjust as we learn more? • Ensure grazing programs have an objective statement about maintaining or improving sagebrush habitat in order to provide an intent for standards and monitoring.	SOL	ASAP
All	Fluids? RDFs? Energy Development?	Develop a table summarizing existing conditions for development and for RFDs for Great Basin by population.	Matt, Frank, BLM PMs	9/8/14
All	Fluid minerals	Consider incorporating the language from the Lander plan that addresses the approach of prioritizing fluid mineral development outside PACs.	Matt to provide language to SOL for review. PMs incorporate	ADPP

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Applicable Sub-regions?	Topic or Resource Program	Outcome and Action	Who?	NV/CA
			into ADPPs.	
Oregon	ROW and mining	Review general habitat for infrastructure and mining management direction in population #31	Jerry and Joan	8/21/14
All	Habitat maps	BLM State offices should work with USFWS, the Solicitor's Office, and internally when/if they get new maps from their respective State counterparts that identify new or redefined boundaries for GRSG habitat.	BLM State Offices (PMs?) and SOL	On-going
Utah	Restoration	ADPP should include the following language regarding restoration: "Restoration needs to occur in areas where birds are able and likely to re-settle or the ratio of restoration must necessarily increase. One option could be restoration of habitat adjacent to existing populations."	Quincy add to ADPP	ADPP
Utah	ROWs / Corridors	Coordinate with USFWS, the Solicitor's Office, and internally regarding designation of new energy corridors.	Quincy and SOL	ADPP
Utah	Habitat maps	State of Utah has identified new areas that they are labeling as PACs. These new areas were not identified in the DEIS as non-habitat. Need to determine whether BLM can include these areas of non-habitat within newly identified Utah PACs into priority management (red areas on map within PACs).	SOL	ASAP
Utah	Clarity	Add paragraph to the ADPP that explains why 23,000 acres	Quin	ADPP

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		identified in the DEIS as PPMA? is now considered to be within PGMA	cy	
Utah	Policy	For mineral materials, leasable minerals, and non-energy minerals in PPMA, ADPP will consider not allowing expansion of existing mines within 4-miles of leks due to the sensitivity of the fragmented populations in Utah. USFWS to provide science to back it up.	Quincy and Pat	8/21
Utah	Coal Leasing Stipulations	SOL to counsel BLM on appropriateness of applying a 4-mile NSO buffer for coal mining.	SOL	ASAP
Idaho	Clarity	Provide short description of the rationale for three management zones; why those three zones (and their corresponding management actions) make sense for all resource uses, not just fire; and how management decisions in those three zones meets NPT Guidance (for all threats).	Brent	ADPP
Idaho	Fluid minerals	The BLM and Forest Service approaches are different; revise for clarity or clearly articulate the reason for the different approaches.	Glen and Brent	ADPP
Idaho	Fluids Minerals	Determine if an area should be closed to oil and gas but open for geothermal because of potential.	SOL	ASAP

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All	Vegetation Management/ Prescribed Fire	Incorporate the following language regarding when fire would be used as a vegetation treatment tool for areas with <12" precip. • Avoid using prescribed fire in Greater Sage-Grouse habitat unless evaluation of site-specific conditions demonstrate that there would be a net benefit for sage-grouse. If prescribed fire is used in Greater Sage-Grouse habitat, include an analysis in the NEPA document that indicates how Greater Sage-Grouse goals and objectives will be addressed and met by its use, why alternative techniques were not selected, and a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. • If prescribed fire is to be used at the implementation level, at a minimum, the burn plan will indicate how Conservation Objective Team/land use plan objectives would be addressed and met and why alternative techniques were not selected. • Avoid prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush or other xeric sagebrush species, or in areas with a potential for post-fire exotic annual dominance. However, after other treatment opportunities have been explored and as site-specific variables allow, prescribed fire could be used in these areas to meet specific fuels objectives that would maintain, improve, or restore Greater Sage-Grouse habitat in	Lauren to consolidate language PMs to incorporate into ADPP	ADPP

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		PPMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). • Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and would protect, maintain, increase, or enhance winter range habitat quality.		
All	Disturbance	All ADPPs should refer to the "disturbance cap" instead of disturbance threshold.	PMs to incorporate into ADPPs	ADPP
All	Conifers/Veg Management?	Incorporate the following common goal for conifer removal: "Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like VDTT and the FIAT report will help refine the location for specific priority areas to be treated."	PMs to incorporate as written into ADPPs	ADPP
All	Fire	Ensure ADPPs discuss the current authority for temporary closures as a travel management tool to reduce fire ignition risk. "In PPMA and PGMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed	PMs to verify this is discussed in Chapter 2.	ADPP

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All	Fluid Minerals	Exemptions related to fluid minerals - All ADPPs will consider NPT Guidance	PMS	ADPP
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All	Consistency	Disturbance and Monitoring Sub-team to continue work on disturbance framework striving for a simple formula.	Frank / Vicki / Gordon	9/8/14
All	Consistency	Develop a template for priority management/habitat to PAC crosswalk. This would include a map showing an overlay of priority habitat/management and general habitat/management with the PACs.	Kathy and Matt	9/22/14
All	Clarity	Define loose language (e.g., "if technically and economic feasible…" what is technical feasibility?)	Ed	
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Utah	Policy	For mineral materials, leasable minerals, and non-energy minerals in PPMA, ADPP will consider not allowing expansion of existing mines within 4-miles of leks due to the sensitivity of the fragmented populations in Utah. USFWS to provide science to back it up.	Quincy and Pat	8/21
Utah	Coal Leasing Stipulations	SOL to counsel BLM on appropriateness of applying a 4-mile NSO buffer for coal mining.	SOL	ASAP
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Idaho	Fluid minerals	The BLM and Forest Service approaches are different; revise for clarity or clearly articulate the reason for the different approaches.	Glen and Brent	ADPP
Idaho	Fluids Minerals	Determine if an area should be closed to oil and gas but open for geothermal because of potential.	SOL	ASAP

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NVCA_PUB_3843
1.1
07/22/2015

BISON CONNECT

Tague, Melvin (Joe) <jtague@blm.gov>

"Old Growth" Pinyon/Juniper Language

4 messages

Quincy Bahr <qfbahr@blm.gov> Mon, Jul 21, 2014 at 10:25 AM
To: Melvin Tague <jtague@blm.gov>, Brent Ralston <bralston@blm.gov>, Joan Suther <jsuther@blm.gov>

All,

With all the focus on p/j encroachment, the Utah FWS has asked that we include a management action that limits reduction of "old growth" p/j. Then they asked us to provide a definition of such. The FS in Utah has included something general, like removing persistent stands of trees over 100 years old should be avoided, but my IDT really isn't warm to that kind of language. At this point, we've worded our management action to focus on removing "encroaching" p/j to restore sagebrush habitat, going with the concept that so-called "stable stands" of p/j that are ecologically in an area not conducive to sagebrush won't fit that management approach, dodging the "retain" p/j concept altogether.

Do any of you have other language limiting p/j treatment in p/j ecological areas that you'd be willing to share?

Quincy Bahr

Brent Ralston <bralston@blm.gov> Mon, Jul 21, 2014 at 10:45 AM
To: Quincy Bahr <qfbahr@blm.gov>
Cc: Melvin Tague <jtague@blm.gov>, Joan Suther <jsuther@blm.gov>

Quincy,

Here is our management action and language for old growth. I've also attached an email with the reference.

VEG-8: Utilize conifer (juniper) removal treatments to reduce the extent of conifer encroachment areas. Refrain from using prescribed fire and conducting removal projects in old-growth juniper stands. Old-growth juniper trees are characterized by rounded tops and spreading canopies, often containing dead limbs and/or spike tops, large branches near the base of the tree, as well as furrowed, fibrous bark, and are typically host to arboreal lichens. Leader growth in the upper quarter of the tree is usually less than one inch. These trees are generally distributed on rock outcrop or rubble land soils, or other soils with coarse fragments in the soil-surface and/or slopes over 12-25%, where juniper vegetation type is the climax plant community (IDFG 2000; Miller et al 2005; USDI and USGS 2007).

Brent Ralston
Greater Sage-Grouse Planning Lead
Idaho and Southwestern Montana Subregion
Idaho State Office
208-373-3812

-----Original Message-----
From: Quincy Bahr [mailto:qfbahr@blm.gov]
Sent: Monday, July 21, 2014 8:26 AM

To: Melvin Tague; Brent Ralston; Joan Suther
Subject: "Old Growth" Pinyon/Juniper Language

All,

With all the focus on p/j encroachment, the Utah FWS has asked that we include a management action that limits reduction of "old growth" p/j. Then they asked us to provide a definition of such. The FS in Utah has included something general, like removing persistent stands of trees over 100 years old should be avoided, but my IDT really isn't warm to that kind of language. At this point, we've worded our management action to focus on removing "encroaching" p/j to restore sagebrush habitat, going with the concept that so-called "stable stands" of p/j that are ecologically in an area not conducive to sagebrush won't fit that management approach, dodging the "retain" p/j concept altogether.

Do any of you have other language limiting p/j treatment in p/j ecological areas that you'd be willing to share?

Quincy Bahr

140422 Lepak Old Growth Juniper.pdf
38K

Melvin (Joe) Tague <jtague@blm.gov> Mon, Jul 21, 2014 at 12:06 PM
To: Quincy Bahr <qfbahr@blm.gov>, Brent Ralston <bralston@blm.gov>, Joan Suther <jsuther@blm.gov>

All,

We did not mention "old growth" P/J in or Proposed Plan. We have the following action:

Action G-VEG-WD 3: On public lands, Manage pinyon- and/or juniper stands in encroached sagebrush vegetation communities to meet GRSG habitat objectives (Table 2-6). Prioritize Phase I and early Phase II pinyon and/or juniper stands condition in areas with a sagebrush component and select treatment methods that maintain sagebrush and shrub cover and composition. Only treat habitats in late Phase II or Phase III condition to create movement corridors, connect habitats, or reduce the potential for catastrophic fire.

The update State of Nevada alternative does have an action with "old growth" as follows:

TMA-7.3: Prioritize areas for treatment of Phase III Pinyon and/or-Juniper encroachment in strategic areas to break up continuous, hazardous fuel beds. Treat areas that have the greatest opportunity for recovery to SGMAS based on ecological site potential. Old growth trees should be protected on woodland sites.

Since this is a sage-grouse plan and not a woodland management, I don't see the need to mention it. If it was an issue on a site, it should be addressed at the implementation level.

Joe

-----Original Message-----
From: Quincy Bahr [mailto:qfbahr@blm.gov]

Sent: Monday, July 21, 2014 7:26 AM
To: Melvin Tague; Brent Ralston; Joan Suther
Subject: "Old Growth" Pinyon/Juniper Language

All,

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Do any of you have other language limiting p/j treatment in p/j ecological areas that you'd be willing to share?

Quincy Bahr

Suther, Joan <jsuther@blm.gov> Mon, Jul 21, 2014 at 12:13 PM
To: Brent Ralston <bralston@blm.gov>
Cc: Quincy Bahr <qfbahr@blm.gov>, Melvin Tague <jtague@blm.gov>

Hi all - here is our language:

Retain all culturally significant and important wildlife trees that originated prior to 1850 (old trees) and all old growth stands of juniper within 4 miles of occupied or pending leks. See OSU Technical Bulletin 152, or its successor, for the key characteristics of old trees. Old growth stands are those where the dominant trees in the stand meet the key characteristics for old trees.

We also reference Miller's paper, as Brent does.

On Mon, Jul 21, 2014 at 7:45 AM, Brent Ralston <bralston@blm.gov> wrote:

> Quincy,
>
> Here is our management action and language for old growth. I've also attached an email with the reference.
>
> VEG-8: Utilize conifer (juniper) removal treatments to reduce the extent of conifer encroachment areas. Refrain from using prescribed fire and conducting removal projects in old-growth juniper stands. Old-growth juniper trees are characterized by rounded tops and spreading canopies, often containing dead limbs and/or spike tops, large branches near the base of the tree, as well as furrowed, fibrous bark, and are typically host to arboreal lichens. Leader growth in the upper quarter of the tree is usually less than one inch. These trees are generally distributed on rock outcrop or rubble land soils, or other soils with coarse fragments in the soil-surface and/or slopes over 12-25%, where juniper vegetation type is the climax plant community (IDFG 2000; Miller et al 2005; USDI and USGS 2007).

> Brent Ralston
> Greater Sage-Grouse Planning Lead
> Idaho and Southwestern Montana Subregion
> Idaho State Office
> 208-373-3812
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> -----Original Message-----
> From: Quincy Bahr [mailto:qfbahr@blm.gov]
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>
> Do any of you have other language limiting p/j treatment in p/j ecological areas that you'd be willing to share?
>
> Quincy Bahr

--
Joan Suther
Greater Sage-grouse Project Manager
Oregon Sub-region
541-573-4445 Office
541-589-0251 Cell
541-573-4411 Fax

Brent Ralston

From: Lepak, Dominika
Sent: Tuesday, April 22, 2014 4:39 PM
To: Meredith Zaccherio; Brent Ralston
Subject: Fwd: Old-Growth Juniper Definitions

The old-growth juniper definitions I promised yesterday, with links to the references.

---------- Forwarded message ----------
From: **Burkhardt, Glen** <gburkhardt@blm.gov>
Date: Tue, Apr 22, 2014 at 2:48 PM
Subject: Re: Old-Growth Juniper Definitions
To: "Lepak, Dominika" <dlepak@blm.gov>

I like it, we could call it old growth avoidance if you all like it better. Thanks, Glen

On Tue, Apr 22, 2014 at 2:21 PM, Lepak, Dominika <dlepak@blm.gov> wrote:
Glen - if this looks good to you, I will send it on to Meredith and Brent. I don't know if "treatment avoidance" is the right term, but I'm not coming up with anything else. Thanks!

For purposes of treatment avoidance, old-growth juniper is defined by location on the landscape and tree growth form.

Growth Form: Old-growth juniper trees are characterized by rounded tops and spreading canopies, often containing dead limbs and/or spike tops, large branches near the base of the tree, as well as furrowed, fibrous bark, and are host to arboreal lichens. Leader growth in the upper quarter of the tree is usually less than one inch.

Landscape Distribution: Generally Rock Outcrop or Rubble Land soils, or other soils with coarse fragments in the soil-surface and/or slopes over 12-15%, where juniper vegetation type is the climax plant community.

IDFG. 2000. Composition, Structure and Distribution of Utah Juniper Plant Associations - Snake River Resource Area, Idaho.
http://fishandgame.idaho.gov/ifwis/idnhp/cdc_pdf/u00rus04.pdf

Miller et. al. 2005. Bilogy, Ecology, and Management of Western Juniper (Juniperus occidentalis). Oregon State University Agricultural Experiment Station Technical Bulletin 152, 82 pp.
http://juniper.oregonstate.edu/bibliography/documents/phpQ65pOk_tb152.pdf

USDI and USGS. 2007. Western Juniper Field Guide; Asking the right questions to select appropriate management actions. Circular 1321. 61 pp.
http://pubs.usgs.gov/circ/1321/pdf/circ1321.pdf
--
Nika Lepak
Rangeland Monitoring and Ecology

BLM, Idaho State Office
(208)373-3810
dlepak@blm.gov

--
Glen Burkhardt
BLM Idaho Fuels Management Specialist
Office: (208) 373-4047
Cellular: (208) 830-2592

--
Nika Lepak
Rangeland Monitoring and Ecology
BLM, Idaho State Office
(208)373-3810
dlepak@blm.gov

BISON CONNECT

Tague, Melvin (Joe) <jtague@blm.gov>

Split Estate Language

3 messages

Lauren Mermejo <lmermejo@blm.gov> Tue, Sep 16, 2014 at 10:36 AM
To: Quincy Bahr <qfbahr@blm.gov>, Brent Ralston <bralston@blm.gov>, Joan Suther <jsuther@blm.gov>, Melvin Tague <joe_m_tague@blm.gov>
Cc: Johanna Munson <jmunson@blm.gov>

Hi You All-
Could you all please send your fluid mineral language for how you are addressing split estate (what stipulations are being applied) to Sarah Shattuck and Aaron Moody ASAP - like within the next hour or two?
Thanks....once again we are looking for a consistent approach to this issue due to the legal applicability.
Lauren

Sent from my iPhone
Lauren

Bahr, Quincy <qfbahr@blm.gov> Tue, Sep 16, 2014 at 11:05 AM
To: Sarah Shattuck <Sarah.Shattuck@sol.doi.gov>, Aaron Moody <aaron.moody@sol.doi.gov>
Cc: Brent Ralston <bralston@blm.gov>, Joan Suther <jsuther@blm.gov>, Melvin Tague <joe_m_tague@blm.gov>, Johanna Munson <jmunson@blm.gov>, Lauren Mermejo <lmermejo@blm.gov>

We were planning to apply every stipulation applicable to areas where BLM has both mineral and surface estate to areas where the BLM has just the mineral estate, to the degree that the site-specific circumstances allow. We did not specify different stipulations.

We apply the NTT language, with an adjustment based on the RDF exceptions:
"Where the federal government owns the mineral estate in PPMAs, and the surface is in non-federal ownership, apply the conservation measures applied on public lands.

"Where the federal government owns the surface, and the mineral estate is in non-federal ownership in PPMAs, the RDFs identified in Appendix J would be applied to surface developments, unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project:
- A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity;
- A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat;
- Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed."

Hope this helps.

Q

On Tuesday, September 16, 2014, Lauren Mermejo <lmermejo@blm.gov> wrote:

> Hi You All-
> Could you all please send your fluid mineral language for how you are addressing split estate (what stipulations are being applied) to Sarah Shattuck and Aaron Moody ASAP - like within the next hour or two?
> Thanks....once again we are looking for a consistent approach to this issue due to the legal applicability.
> Lauren

> Sent from my iPhone
> Lauren

--
Sent from Gmail Mobile

Melvin (Joe) Tague <jtague@blm.gov> Tue, Sep 16, 2014 at 3:37 PM
To: Lauren Mermejo <lmermejo@blm.gov>

Here you go:

Mineral Split Estate Actions

Goal G-MSE 1: Manage federal split estate (private surface/federal minerals; federal surface/private minerals) to provide for the conservation, maintenance, and enhancement of PPMA and PGMA.

Objective G-MSE 1: For federal mineral estate, minimize surface disturbance in PPMA and PGMA to the maximum extent permissible under existing authorities.

Objective G-MSE 2: For federal surface estate, minimize surface disturbance in PPMA and PGMA to the maximum extent permissible under existing authorities consistent with use rights to the private mineral estate.

Action G-MSE 1: Where the BLM administers the mineral estate in GRSG habitat and the surface is in nonfederal ownership, apply the appropriate conservation measures and RDFs that are applied on public lands in coordination with the SETT, NDOW and CDFW.

Action G-MSE 2: Where the federal government owns the surface and the mineral estate is in nonfederal ownership in PPMA and PGMA, apply appropriate surface use stipulations and RDFs to surface development in coordination with the SETT, NDOW and CDFW..

-----Original Message-----
From: Lauren Mermejo [mailto:lmermejo@blm.gov]
Sent: Tuesday, September 16, 2014 7:36 AM
To: Quincy Bahr; Brent Ralston; Joan Suther; Melvin Tague
Cc: Johanna Munson
Subject: Split Estate Language

Hi You All-
Could you all please send your fluid mineral language for how you are addressing split estate (what stipulations are being applied) to Sarah Shattuck and Aaron Moody ASAP - like within the next hour or two?
Thanks....once again we are looking for a consistent approach to this issue due to the legal applicability.
Lauren

Sent from my iPhone
Lauren

Tague, Melvin (Joe) <jtague@blm.gov>

Wild Horses

3 messages

Lauren Mermejo <lmermejo@blm.gov> Tue, Sep 16, 2014 at 1:01 PM
To: Joan Suther <jsuther@blm.gov>, Melvin Tague <joe_m_tague@blm.gov>, Quincy Bahr <qfbahr@blm.gov>, Brent Ralston <bralston@blm.gov>

Could each of you send me your newest and best wild horse and burro
management actions, and goals and objectives if you have any.
I am told that we now need to be consistent in our language - and then
I have to share it with Colorado so they use the same language.
I would like it today, please.
Thanks,
Lauren

Sent from my iPhone
Lauren

Bahr, Quincy <qfbahr@blm.gov> Tue, Sep 16, 2014 at 2:02 PM
To: Lauren Mermejo <lmermejo@blm.gov>
Cc: Joan Suther <jsuther@blm.gov>, Melvin Tague <joe_m_tague@blm.gov>, Brent Ralston <bralston@blm.gov>

I haven't finished rolling in the NV language into the Utah Proposed Plan, but we plan to incorporate the concepts. I say concepts, because Utah does not have separate sage-grouse goals and objective for each separate resource/use. As such, we will not have wild horse goals that deal specifically with sage-grouse, but we will include all the concepts raised by the NV language as management actions, some of which may be rather general management direction to bring in the NV objectives.

Q

On Tuesday, September 16, 2014, Lauren Mermejo <lmermejo@blm.gov> wrote:

> Could each of you send me your newest and best wild horse and burro
> management actions, and goals and objectives if you have any.
> I am told that we now need to be consistent in our language - and then
> I have to share it with Colorado so they use the same language.
> I would like it today, please.
> Thanks,
> Lauren
>
> Sent from my iPhone
> Lauren

--
Sent from Gmail Mobile

Melvin (Joe) Tague <jtague@blm.gov> Tue, Sep 16, 2014 at 3:14 PM
To: Lauren Mermejo <lmermejo@blm.gov>

Here you go for NV-CA.

Wild Horse and Burros

Goal G-WHB 1: Manage active herd management areas (HMAs) and wild horse and burro territories (WHBTs) in PPMA and PGMA habitats to achieve GRSG habitat objectives (Table 2-6). Use all available and future approved management tools to actively manage wild horses and burros within HMAs and WHBTs.

Objective G-WHB 1: Evaluate existing Appropriate Management Levels (AMLs) within HMAs and WHBTs within PPMA and PGMA and make appropriate adjustments to AML to achieve and maintain seasonal GRSG habitats (Table 2-6).

Objective G-WHB 2: Manage wild horse and burro population levels in PPMA and PGMA at the lower limit of the established AML ranges to maintain or enhance GRSG habitat.

Objective G-WHB 3: Prioritize gathers and population growth suppression techniques in HMAs, and WHBTs in PPMA and PGMA, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas occupied by wild horses and burros in PPMA and PGMA, areas as these areas are to be managed for zero wild horses and burros. Additional prioritization would be given for HMAs and WHBTs that are near AML or where a reduction would serve the most beneficial purpose.

Action G-WHB 1: In PPMA and PGMA, assess and adjust AMLs through the NEPA process within HMAs and WHBTs that are at least partially degraded due to wild horses or burros (as identified in grazing land health assessments) if current AML is not being exceeded . Monitor HMAs or WHBTs annually to assess attainment of habitat objectives and to help determine future management decisions. Unless already meeting the lowest level of the established AML range, adjust AMLs to a level consistent with maintaining GRSG habitat objectives (Table 2-6).

Action G-WHB 2: Ensure that Herd Management Area Plans (HMAP) and WHBT plans are developed and/or amended to consider GRSG habitat objectives (Table 2-6) within PPMA and PGMA.

Action G-WHB 3: Continue to use interdisciplinary team specialists to cooperatively conduct land health, proper functioning condition, and habitat objective assessments.

Action G-WHB 4: When WHB populations exceed the upper limit of the established AML range, conduct gathers in combination with the use of population growth suppression techniques to obtain the lowest level of the AML range. This would enable AML to be maintained for longer periods and reduce the frequency of gathers and associated cost and effort.

Action G-WHB 5: Consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) where HMAs and WHBT overlap with PPMA and PGMA to enhance recovery time and restoration efforts.

Action G-WHB 6: Provide new water locations to ensure dispersal or avoidance of sites heavily impacted by wild horses (Feist 1971; Pellegrini 1971; Ganskopp and Vavra 1986; Naiman et al. 1992) in compliance with Nevada state Water Law and subject to valid existing rights.
Action G-WHB 7: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program.

-----Original Message-----
From: Lauren Mermejo [mailto:lmermejo@blm.gov]
Sent: Tuesday, September 16, 2014 10:01 AM

To: Joan Suther; Melvin Tague; Quincy Bahr; Brent Ralston
Subject: Wild Horses

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I would like it today, please.
Thanks,
Lauren

Sent from my iPhone
Lauren

NVCA_PUB_3947
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07/22/2015

BISON CONNECT

Tague, Melvin (Joe) <jtague@blm.gov>

NPT Presentation v1.0.pptx

5 messages

Melvin (Joe) Tague <jtague@blm.gov> Wed, Jun 11, 2014 at 7:48 PM
To: Amy Lueders <alueders@blm.gov>, Lauren Mermejo <lmermejo@blm.gov>

Amy and Lauren,

Here is the first draft of the presentation for the NPT. It is the same as the WGA presentation sent to Glenn for tomorrow. I also sent a copy to Kathy Stangl earlier.

Joe

NPT Presentation v1.0.pptx
6827K

Amy Lueders <alueders@blm.gov> Thu, Jun 12, 2014 at 6:45 PM
To: Joe M Tague <jtague@blm.gov>

Can u pls send directly to Noreen and Ren?
Thx

Sent from my iPhone

Begin forwarded message:

> From: Noreen Walsh <noreen_walsh@fws.gov>
> Date: June 12, 2014 at 2:56:32 PM PDT
> To: Amy Lueders <alueders@blm.gov>
> Subject: RE: NPT Presentation v1.0.pptx
>
> Amy,
>
> As luck would have it, I had to be out of the room on the phone when Glen gave this presentation today. Unfortunately this one attached here is corrupted somehow – much of it does not display. Any chance Joe could send it again to me and to Ren? (I think he would be interested to see this as well).
>
> Thanks very much,
>
> Noreen
>
> Noreen Walsh

Regional Director

Mountain-Prairie Region

U. S. Fish and Wildlife Service

303 236 7920

The Mountain-Prairie Region of the U. S. Fish and Wildlife Service: *We provide conservation stewardship of some of America's most scenic lands, to ensure healthy fish and wildlife for the enjoyment and benefit of all people.*

From: Amy Lueders [mailto:alueders@blm.gov]
Sent: Wednesday, June 11, 2014 6:29 PM
To: Noreen Walsh
Subject: Fwd: NPT Presentation v1.0.pptx

A preview of tomorrow

Sent from my iPhone

Begin forwarded message:

> From: "Melvin (Joe) Tague" <jtague@blm.gov>
> To: Amy Lueders <alueders@blm.gov>, Lauren Mermejo <lmermejo@blm.gov>
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Melvin (Joe) Tague <jtague@blm.gov> Thu, Jun 12, 2014 at 7:32 PM
To: Noreen Walsh <noreen_walsh@fws.gov>, ren_lohoefener@fws.gov
Cc: Amy Lueders <alueders@blm.gov>

Noreen and Ren,

This is the PowerPoint that Randy and I prepared for Glenn to present. I assume there were little or no changes to it. We plan to use the same on for the National Policy Team discussion with some minor tweaks.

Joe

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> Joe

Governor's Task Force Presentation meeting draft v3.1 June 9 2014 Final.pptx
6829K

Noreen Walsh <noreen_walsh@fws.gov> Thu, Jun 12, 2014 at 7:34 PM
To: "Melvin (Joe) Tague" <jtague@blm.gov>, Ren Lohoefener <ren_lohoefener@fws.gov>
Cc: Amy Lueders <alueders@blm.gov>

Thanks so much Joe!

Ren, I asked them to copy you as well; this is a good overview of progress and plans in the federal fire management arena as it relates to sage-grouse. The presentation was given at the Sage-grouse Task Force today.

Noreen

Noreen Walsh

Regional Director

Mountain-Prairie Region

U. S. Fish and Wildlife Service

303 236 7920

The Mountain-Prairie Region of the U. S. Fish and Wildlife Service: *We provide conservation stewardship of some of America's most scenic lands, to ensure healthy fish and wildlife for the enjoyment and benefit of all people.*

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Thanks very much,

Noreen

Noreen Walsh

Regional Director

Mountain-Prairie Region

U. S. Fish and Wildlife Service

303 236 7920

The Mountain-Prairie Region of the U. S. Fish and Wildlife Service: *We provide conservation stewardship of some of America's most scenic lands, to ensure healthy fish and wildlife for the enjoyment and benefit of all people.*

From: Amy Lueders [mailto:alueders@blm.gov]
Sent: Wednesday, June 11, 2014 6:29 PM
To: Noreen Walsh
Subject: Fwd: NPT Presentation v1.0.pptx

A preview of tomorrow

Sent from my iPhone

Begin forwarded message:

> From: "Melvin (Joe) Tague" <jtague@blm.gov>
> To: Amy Lueders <alueders@blm.gov>, Lauren Mermejo <lmermejo@blm.gov>
> Subject: NPT Presentation v1.0.pptx
>
> Amy and Lauren,

Here is the first draft of the presentation for the NPT. It is the same as the WGA presentation sent to Glenn for tomorrow. I also sent a copy to Kathy Stangl earlier.

Joe

Lohoefener, Ren <ren_lohoefener@fws.gov> Thu, Jun 12, 2014 at 7:37 PM
To: Noreen Walsh <noreen_walsh@fws.gov>
Cc: "Melvin (Joe) Tague" <jtague@blm.gov>, Amy Lueders <alueders@blm.gov>

Gratefully received, thank you

On Thu, Jun 12, 2014 at 4:34 PM, Noreen Walsh <noreen_walsh@fws.gov> wrote:

> Thanks so much Joe!
>
> Ren, I asked them to copy you as well; this is a good overview of progress and plans in the federal fire management arena as it relates to sage-grouse. The presentation was given at the Sage-grouse Task Force today.
>
> Noreen
>
> Noreen Walsh
>
> Regional Director
>
> Mountain-Prairie Region
>
> U. S. Fish and Wildlife Service
>
> 303 236 7920
>
> ***The Mountain-Prairie Region of the U. S. Fish and Wildlife Service:*** *We provide conservation stewardship of some of America's most scenic lands, to ensure healthy fish and wildlife for the enjoyment and benefit of all people.*
>
> ---
>
> **From:** Melvin (Joe) Tague [mailto:jtague@blm.gov]
> **Sent:** Thursday, June 12, 2014 5:32 PM
> **To:** Noreen Walsh; ren_lohoefener@fws.gov
> **Cc:** Amy Lueders
> **Subject:** FW: NPT Presentation v1.0.pptx

Noreen and Ren,

This is the PowerPoint that Randy and I prepared for Glenn to present. I assume there were little or no changes to it. We plan to use the same on for the National Policy Team discussion with some minor tweaks.

Joe

From: Amy Lueders [mailto:alueders@blm.gov]
Sent: Thursday, June 12, 2014 3:45 PM
To: Joe M Tague
Subject: Fwd: NPT Presentation v1.0.pptx

Can u pls send directly to Noreen and Ren?

Thx

Sent from my iPhone

Begin forwarded message:

> From: Noreen Walsh <noreen_walsh@fws.gov>
> Date: June 12, 2014 at 2:56:32 PM PDT
> To: Amy Lueders <alueders@blm.gov>
> Subject: RE: NPT Presentation v1.0.pptx
>
> Amy,
>
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> Thanks very much,
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> Noreen
>
> Noreen Walsh
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>
> U. S. Fish and Wildlife Service

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>
> Joe

Greater Sage-Grouse Planning Strategy

Update on Fire and Invasive Annual Grass Assessment

National Policy Team

June ??, 2014

FOREST SERVICE
DEPARTMENT OF AGRICULTURE

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Background

- Large-scale loss of sagebrush from wildfires and the conversion of sagebrush ecosystem to annual grasses or woodland expansion are contributing to the decline of Greater Sage-grouse.

- BLM, FS and F&WS agreed that a need existed for a strategic assessment of these threats to assist in prioritization of limited funds to maintain or restore habitat.

- Assessment process has evolved from the draft EIS's protocol to one that incorporates:
  - Resistance to invasive annual grasses
  - Resiliency after disturbance (wildfires).

Scientific Basis

- Resistance and Resilience Concepts developed by the WAFWA Fire and Invasive Team Led by Ken Mayer

- Forest Service General Technical Report
  Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse – A Strategic Multi-scale Approach-Chambers et al. (in press)

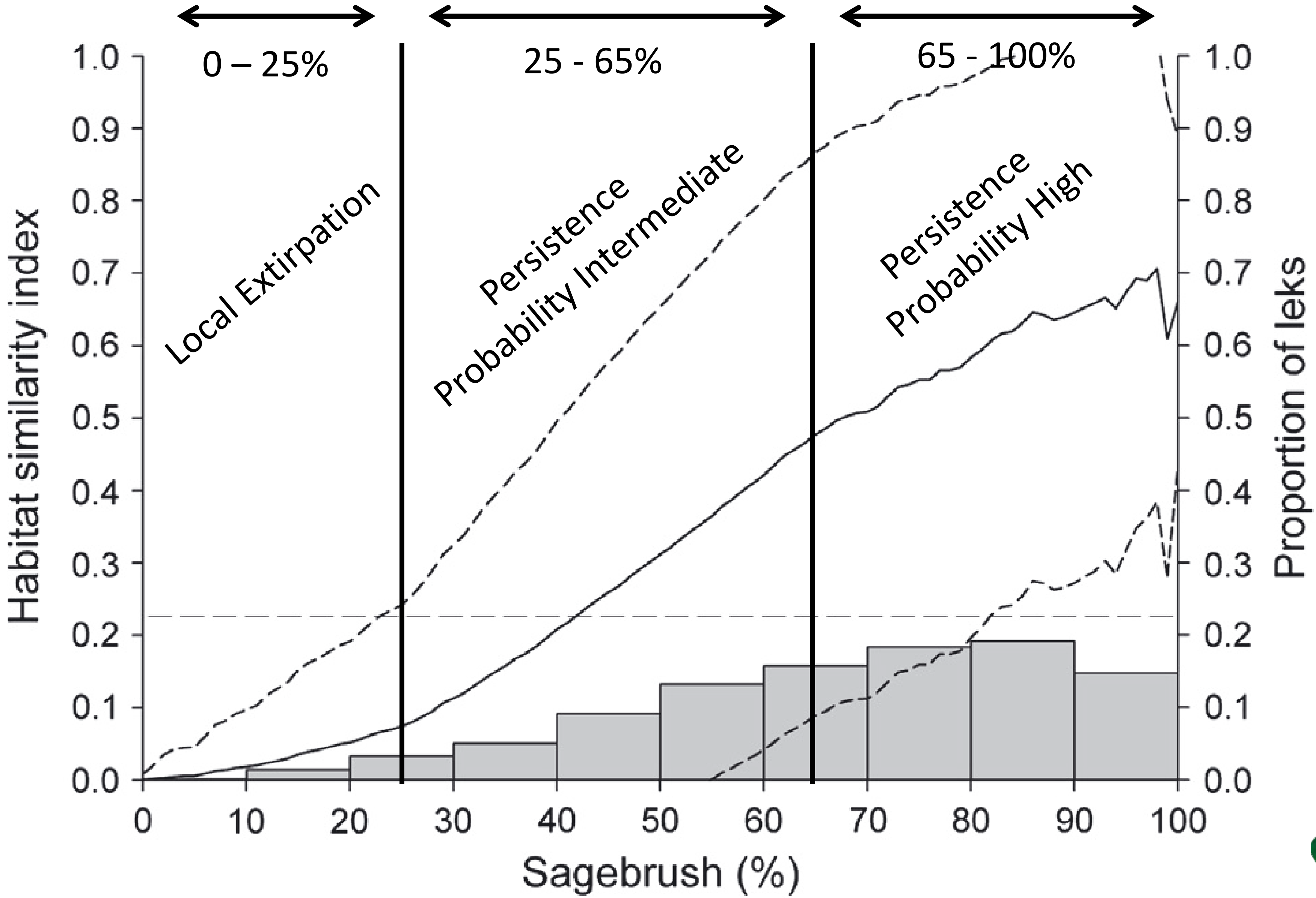
ENVIRONMENTAL GRADIENTS

Warm-Dry ⟷ **Cold-Moist**

→

Resistance to Invasive Annual Grasses and Resilience after Wildfire Increases

SAGEBRUSH LANDSCAPE COVER & SAGE-GROUSE



(modified from Knick et al. 2013)

SAGE-GROUSE HABITAT MATRIX

Proportion of Landscape Dominated by Sagebrush

Resilience to Disturbance & Resistance to Invasive Annual Grasses

	Low **< 25% Sagebrush Landscape Cover**	***Medium*** **26-65% Sagebrush-Landscape Cover**	***High*** **> 66% Sagebrush-Landscape Cover**
High	Sagebrush lacking - Natural recovery likely Low annual invasive risk	Sagebrush limiting - Natural recovery likely Low annual invasive risk	Sagebrush sufficient - Natural recovery likely Low annual invasive risk
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Fire and Invasive Annual Grass Assessment

Objective

- Develop a standardized agency assessment protocol that incorporates Resistance and Resilience concepts into Greater Sage-Grouse Land Use Plan Amendments

Organization

Team Leader

- Mike Pellant (mpellant@blm.gov)

Development Team

- Purpose: Develop assessment protocol using the Resilience & Resistance Matrix
- Included 5 members of the WAFWA Team
- Members from the BLM/FS/FWS/NRCS/USGS

Review Team

- Provided the first level of review and input on assessment protocol
- Provided additional expertise to Development Team

Assessment Protocol

Two-Step Process

- Step 1- Identify high priority (Important) areas for Greater Sage-grouse based on Priority Areas for Conservation (PACs) and management strategies to address threats

- Step 2- Develop interagency/partner implementation plans to maintain or restore priority habitats (process included in FEIS)

STEP 1A

High Density Populations at Highest Risk from Wildfire and Invasive Annual Grasses

PACs in Management Zones III, IV, and V. were evaluated on the basis of high density (75 percent) Breeding Bird Density, sagebrush landscape cover, and soil temperature and moisture regimes (resistance and resilience) to identify initial PACs that are a priority for assessments

High Density Sage-Grouse Habitats at Risk from Conifer Expansion

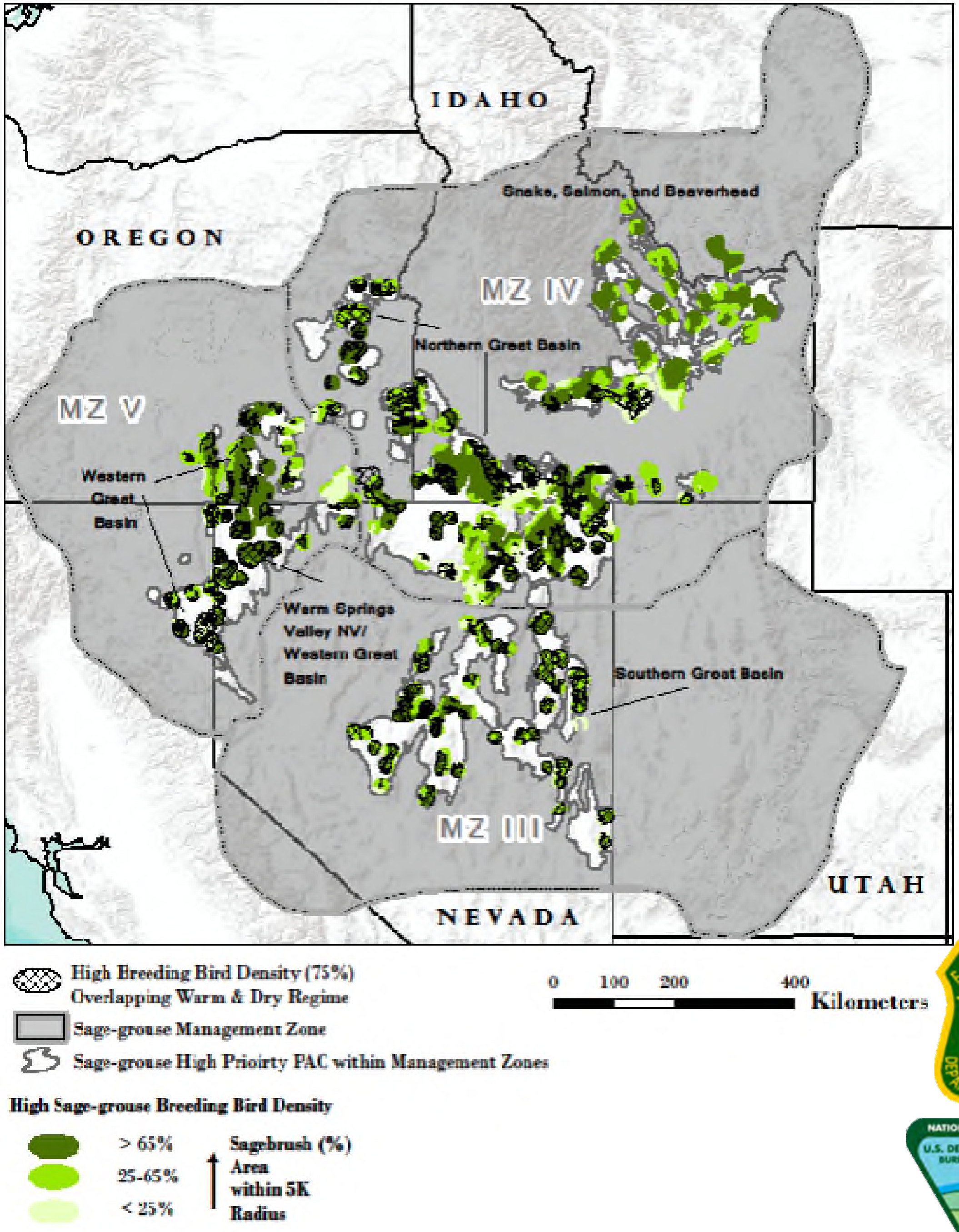
PACs, sagebrush landscape cover, and the 75 percent BBD data were also used in conjunction with the conifer expansion data (Mainer et al. 2013) to provide an initial stratification to determine assessment priority in PACs where conifer removal would benefit important sagebrush habitats.

Priority PACs for Fire/Invasive Assessments

1. Northern Great Basin
2. Southern Great basin
3. Snake, Salmon, and Beaverhead
4. Warm Springs Valley, NV/Western Great Basin
5. Western Great Basin

Focal habitats for assessments are 75% BBD intersected with areas within PAC with > 25% sagebrush landscape cover

Cross-hatched areas are emphasis areas for treatments in or near focal habitats (low resistance and resilience)



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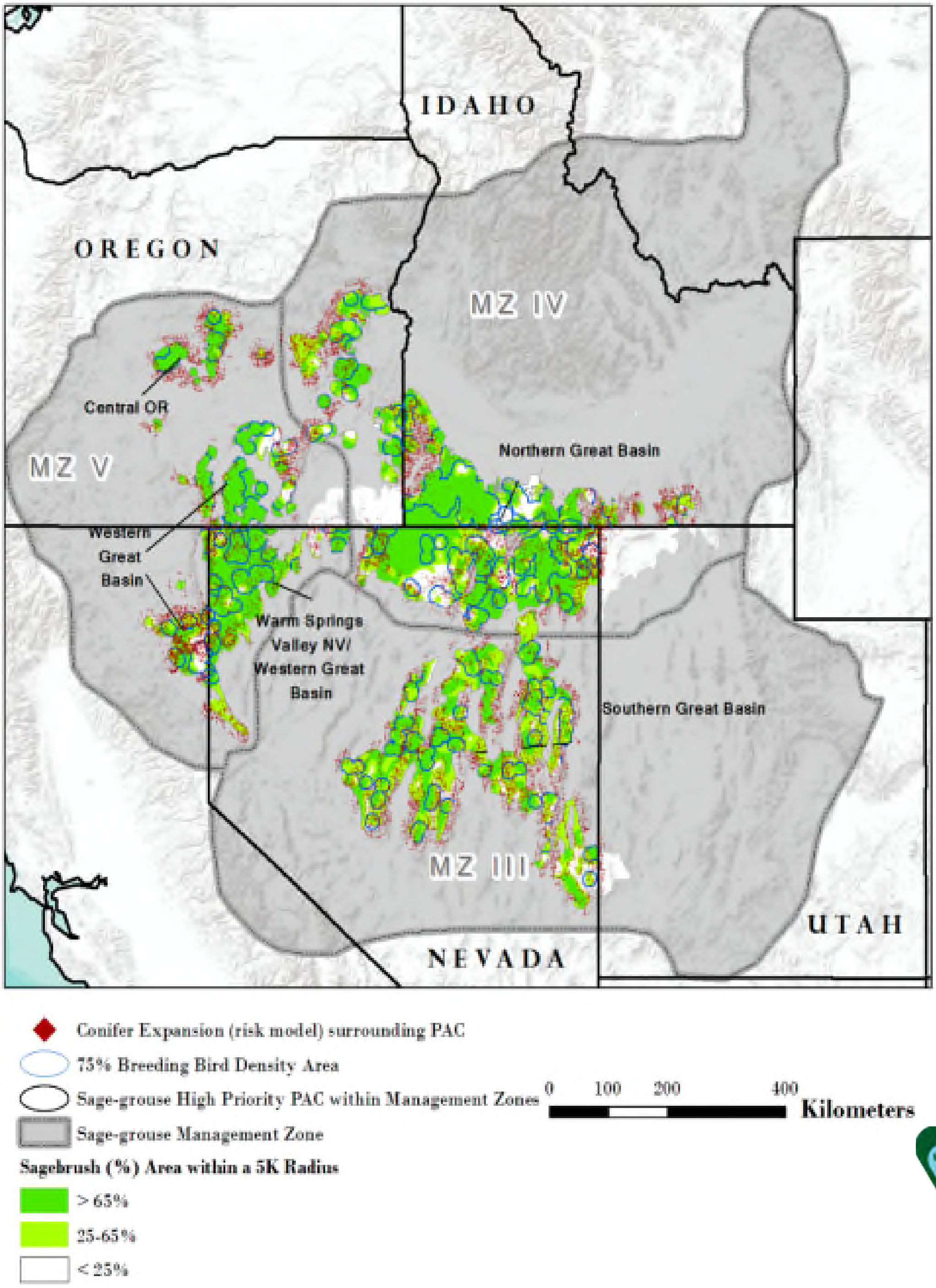

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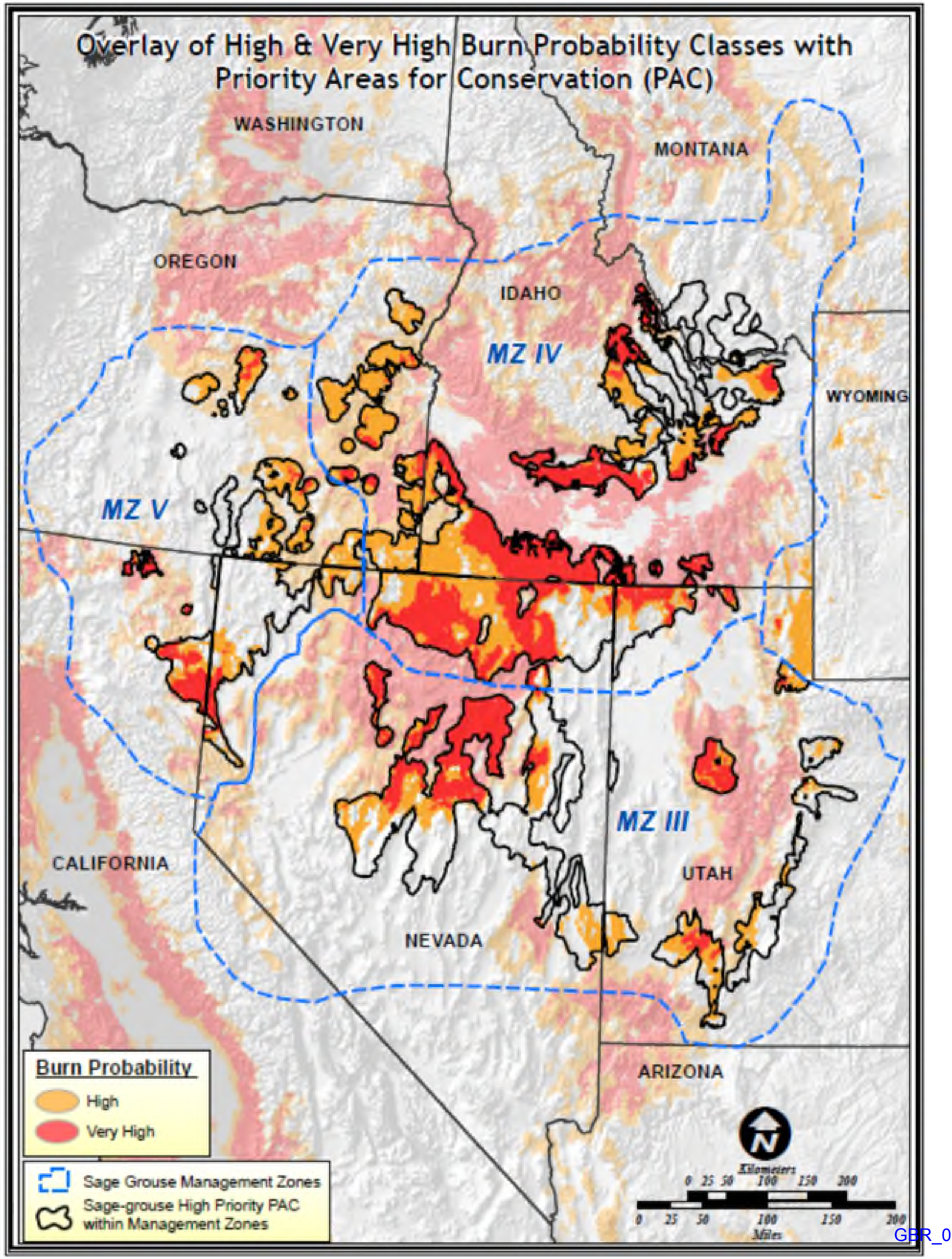
Very high and high probability of burning displayed in Great Basin PACs in Management Zones III, IV, and V.



Results of Step 1B
Identify Management Strategies

Based on Tables 3 and 4 contained in Chambers et. al. (in press)

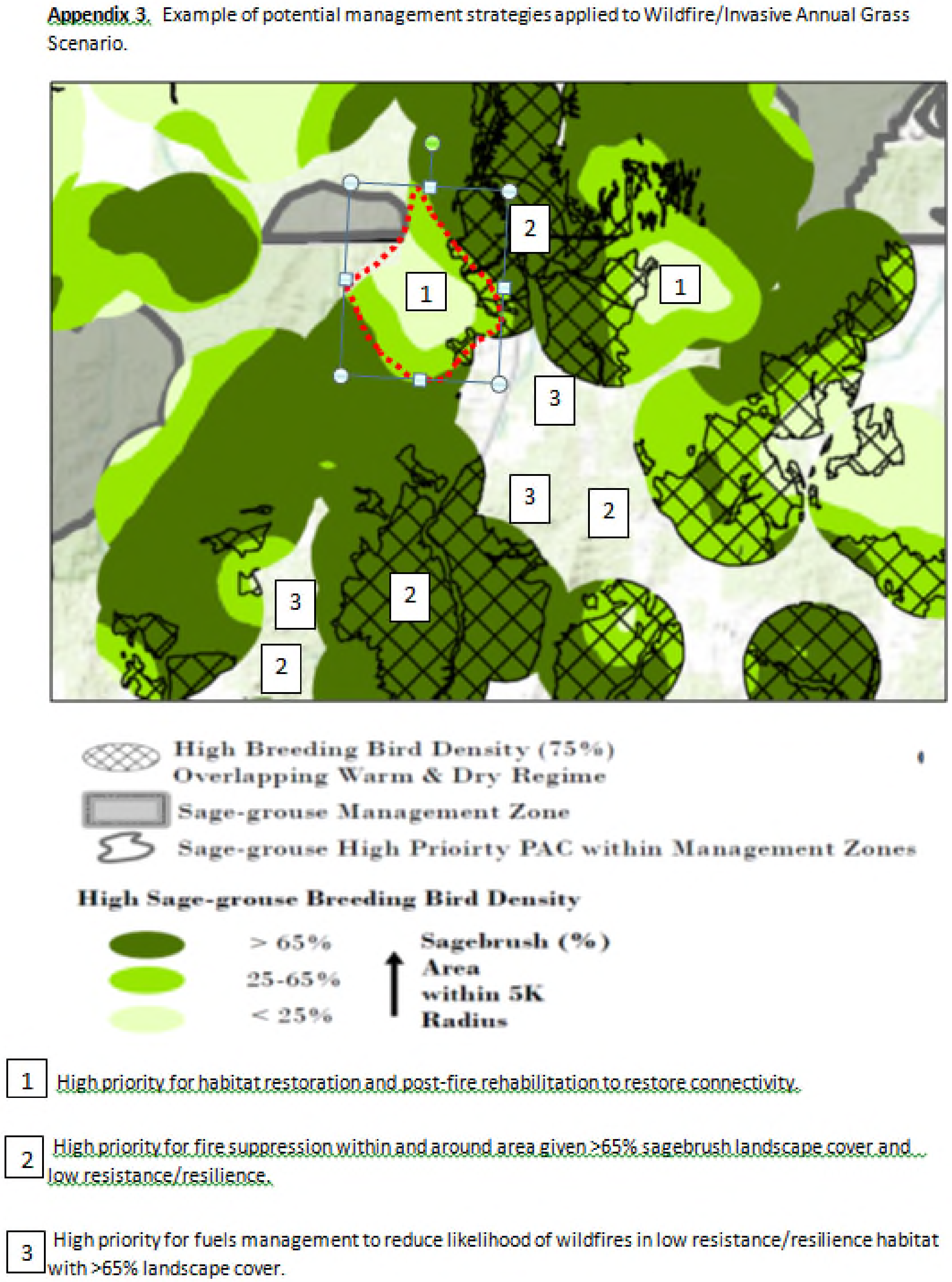
Management Strategies

- Proactive
  - Fuels Management
  - Habitat Recovery/Restoration
- Reactive
  - Fire Operations
  - Post-Fire Rehabilitation

Management Strategies

Example of Step-down management strategies

Red outlined area represent a location where connectivity could be restored.



Appendix 3. Example of potential management strategies applied to Wildfire/Invasive Annual Grass Scenario.

▨ High Breeding Bird Density (75%) Overlapping Warm & Dry Regime

▭ Sage-grouse Management Zone

Sage-grouse High Prioirty PAC within Management Zones

High Sage-grouse Breeding Bird Density

🟩	> 65%	↑ Sagebrush (%) Area within 5K Radius
🟩	25-65%	
🟩	< 25%	

1 High priority for habitat restoration and post-fire rehabilitation to restore connectivity.

2 High priority for fire suppression within and around area given >65% sagebrush landscape cover and low resistance/resilience.

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Step 2

- Incorporate local data and GIS layers to conduct FIAT assessments
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- Issuance of Final Fire and Invasive Annual Grass Assessment Report (FIAT)
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- Based on Pilot Test(s), need to identify a ‘training cadre’ to assist local teams in completing assessments


E. Jones

Greater Sage-Grouse
Planning Strategy

Update on Fire and Invasive Annual Grass Assessment

Western Governors' Association
Sage-grouse Task Force

Colorado Springs, Colorado
June 12, 2014

Background

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Big Sage - Pinyon/Juniper

Mtn Big Sage

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Mtn Big Sage - Mtn Brush

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Resistance to Invasive Annual Grasses and Resilience after Wildfire Increases ⟶

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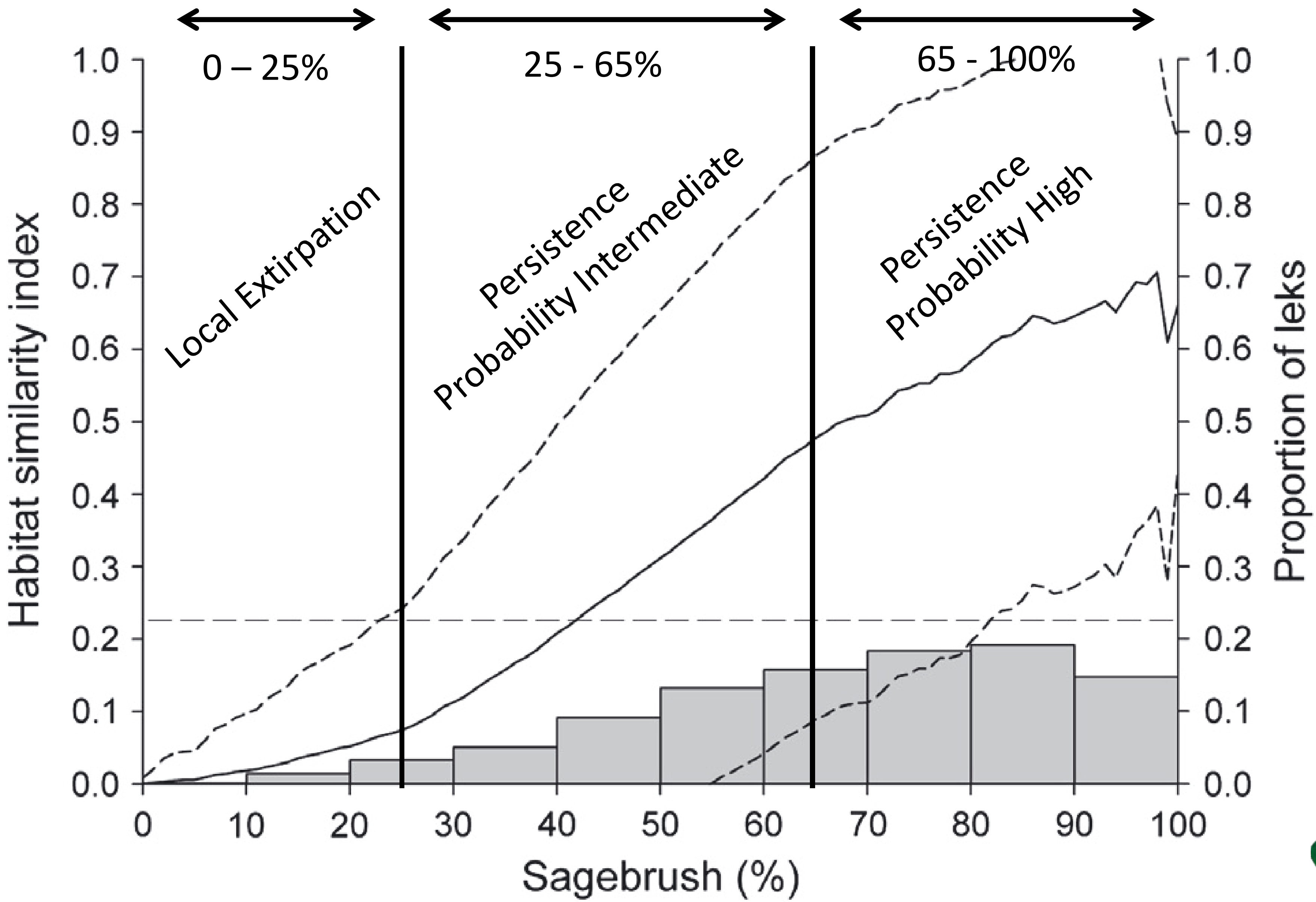

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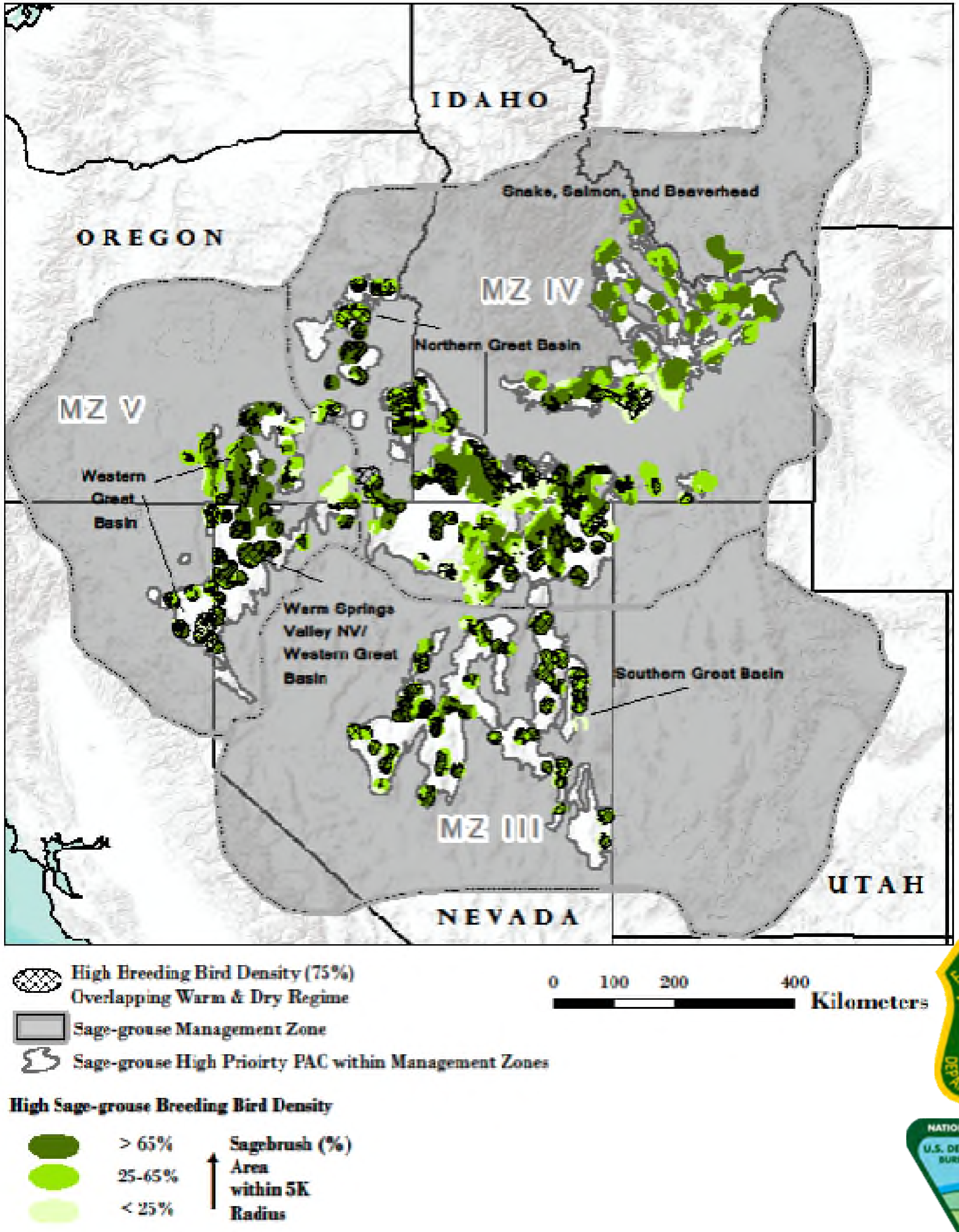

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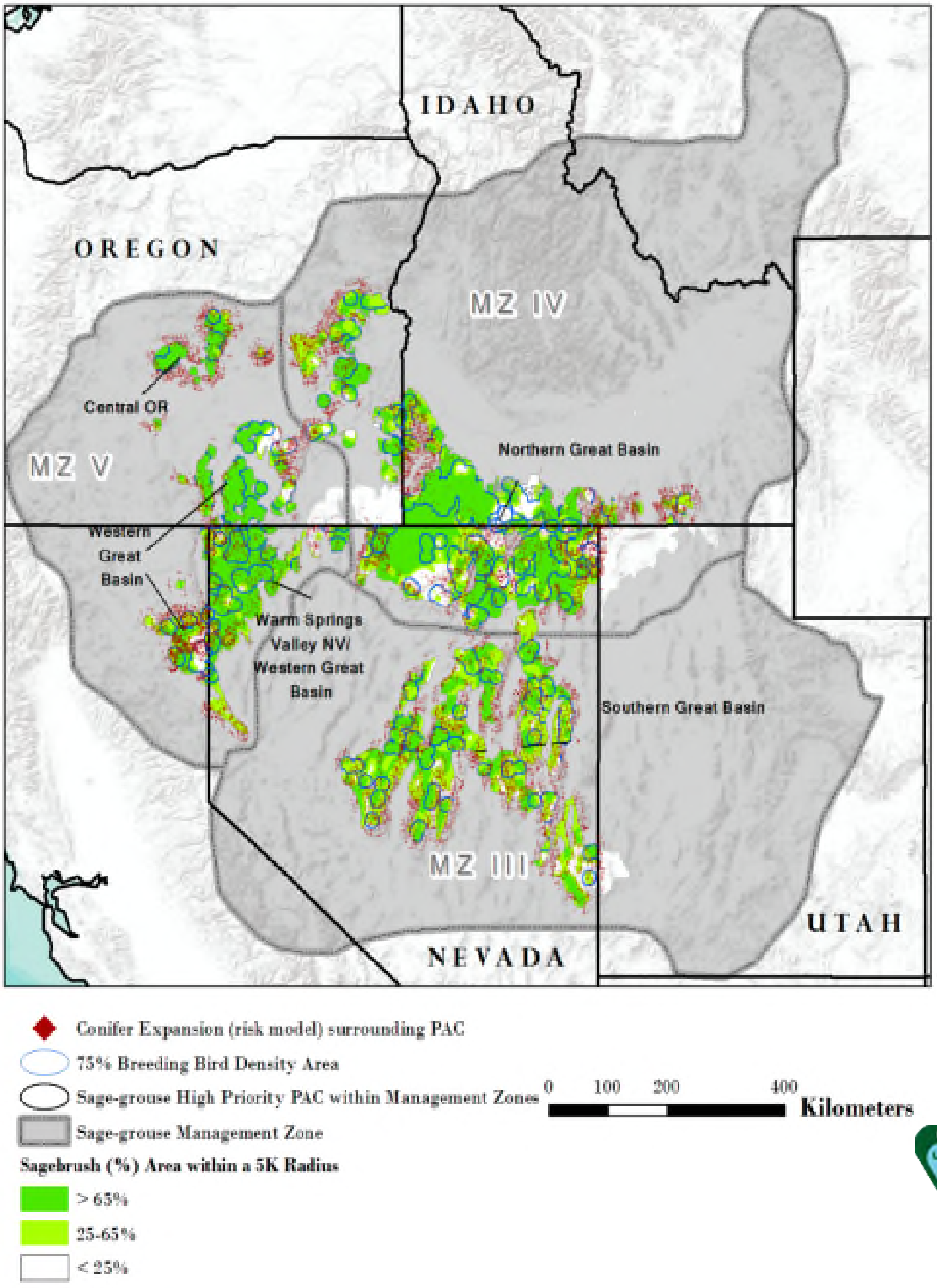

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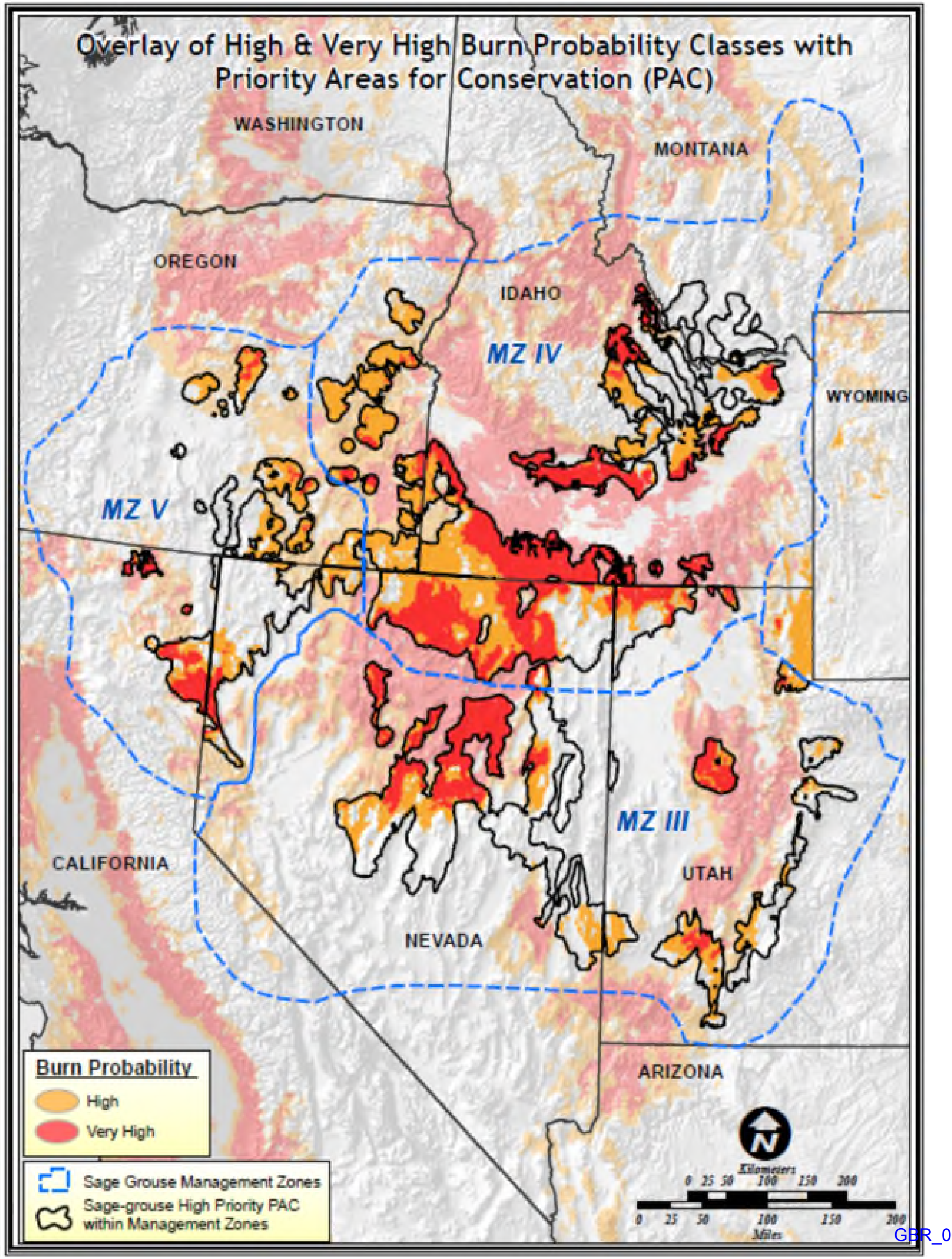

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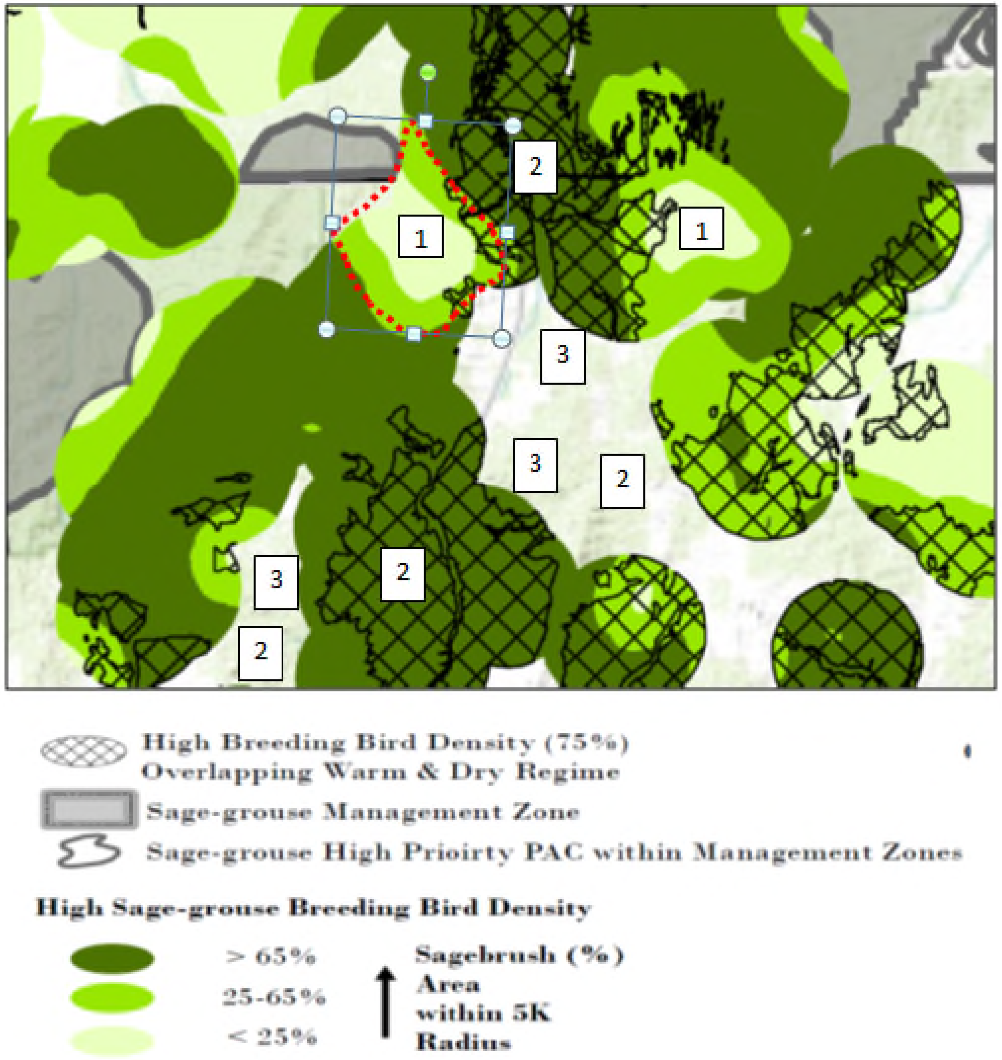

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FOREST SERVICE
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DEPARTMENT OF AGRICULTURE

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NVCA_PUB_3956
2.1
07/22/2015

Tague, Melvin (Joe) <jtague@blm.gov>

Table 2_Existing Rights and Future Projections -NV OR ID UT 2014-09-05

3 messages

Melvin (Joe) Tague <jtague@blm.gov> Fri, Sep 5, 2014 at 3:50 PM
To: Ted Koch <ted_koch@fws.gov>, Amy Lueders <alueders@blm.gov>, Lauren Mermejo <lmermejo@blm.gov>, Ronald Baxter <ronald_baxter@fws.gov>

Here is the final table 2 with all four states.

Table 2_Existing Rights and Future Projections -NV OR ID UT 2014-09-05.docx
30K

Lauren Mermejo <lmermejo@blm.gov> Fri, Sep 5, 2014 at 3:51 PM
To: "Melvin (Joe) Tague" <jtague@blm.gov>

Thanks Joe!!!!

L

From: Melvin (Joe) Tague [mailto:jtague@blm.gov]
Sent: Friday, September 05, 2014 12:50 PM
To: Ted Koch; Amy Lueders; Lauren Mermejo; Ronald Baxter
Subject: Table 2_Existing Rights and Future Projections -NV OR ID UT 2014-09-05

Here is the final table 2 with all four states.

Melvin (Joe) Tague <jtague@blm.gov> Fri, Sep 5, 2014 at 4:06 PM
To: Brent Ralston <bralston@blm.gov>, Quincy Bahr <qfbahr@blm.gov>, Joan Suther <jsuther@blm.gov>

Thanks all, here is what I sent to Ted.

From: Melvin (Joe) Tague [mailto:jtague@blm.gov]
Sent: Friday, September 05, 2014 12:50 PM
To: Ted Koch; Amy Lueders; Lauren Mermejo; Ronald Baxter
Subject: Table 2_Existing Rights and Future Projections -NV OR ID UT 2014-09-05

Here is the final table 2 with all four states.

Table 2_Existing Rights and Future Projections -NV OR ID UT 2014-09-05.docx
30K

Table 2: Great Basin Existing Conditions/Projections of Future Development Direct Impacts (These are initial estimates based on available information and projections. Refinement is expected.)

Resource Allocation		NV/CA		OR		ID		SW MT		UT	
		Acres	% Habitat	Acres	% Habitat	Acres	% Habitat	Acres	% Habitat	Acres	% Habitat
Solar	**Acres of Habitat currently authorized**	0	0	0	0	0	0	0	0	0	0
	Projection of future development (RFDs)	0	0	0	0	0	0	0	0	N/A	N/A
Wind	**Acres of Habitat currently authorized**	61,638	.347%	0	0	0	0	0	0	0	0
	Projection of future development (RFDs)	0	0	0	0	0	0	0	0	Excluded in PPMA = 0	0
ROWs	**Acres of Habitat currently authorized**	Assuming non-linear (Comm Towers and Railroads = 1,493	.008%	This is a duplicate line. Do not report here.	This is a duplicate line. Do not report here.	82,945	0.7%	18,900	1.0%	Assuming non-linear (Comm Towers and Railroads = 1027 (all ownership	0.019%

Version: 9/5/2014

										s)	
	Projection of future development (RFDs)	Unknown	Unknown	This is a duplicate line. Do not report here.	This is a duplicate line. Do not report here.					Unknown	unknown
Fluid Minerals	**Acres of Habitat currently authorized**	1,900	0.011%	42,342	.41%	4135 (leased) 0 (developed)	0.04% (leased) 0 (developed)	?	?	PPMA (federal) 513,410 leased; 43,408 HBP PGMA (federal) 282,851 leased; 164,272 HBP Total Estimated currently disturbed (all ownership) = 32,793 (9,358 in PPMA)	PPMA (federal) 15.17% leased; 1.28% HBP PGMA (federal) 41.71% leased; 24.22% HBP Estimated disturbed = 0.807% (0.277% PPMA)
	Projection of future development (RFDs)	1,246	0.007%	42,342	.41%	20 (developed)	0.0002% (developed)	?	?	4,242 (all Federal)	0.104%

Version: 9/5/2014

Non-energy Leasable Minerals	**Acres of Habitat currently authorized**	61,425(1)	.346%	0	0	66 (leased)	0.0006%			5,362 (all ownership)	0.097%
	Projection of future development (RFDs)	0	0	0	0	66 (developed)	0.0006%			Unknown	unknown
Salable Minerals (Mineral Materials)	**Acres of Habitat currently authorized**	23,081	0.013%	FHWA ROW: 6,494 Mineral Material Pits: 4,496 Total Pit: 10,990 acres	FHWA ROW: 0.065% Mineral Material Pits: 0.045% Total Pit: 0.11%	12,000	0.1%	?	?	24,173 acres permitted 705 acres disturbed (federal)	0.013% disturbed
	Projection of future development (RFDs)	0	0	FHWA ROW: 6,494 Mineral Material Pits: 4,496 Total Pit: 10,990 acres	FHWA ROW: 0.065% Mineral Material Pits: 0.045% Total Pit: 0.11%	1500	0.01%	?	?	Unknown	unknown
Livestock Grazing	**Acres of Habitat currently authorized**	16,009,700	90.2%	9,983,278	98.7%	11,180,900	97.5%			3,254,000 (Federal)	97.1%
	Projection of future development (RFDs)	0	0	9,961,278	97.5%	0	0			Unknown Metric	Unknown Metric
Recreation	**Acres of**	Unknown		5,000	0	600	0.005%			Unknown	

	Habitat currently authorized	Metric		Does not include roads and trails						Metric	
	Projection of future development (RFDs)	n/a	n/a	0	0	25	0.0002%			n/a	n/a
Land Tenure	**Acres of Habitat currently authorized**	0	0	0	0	0	0	0	0	Unknown Metric	Unknown Metric
	Projection of future development (RFDs)	0	0	0	0	0	0	0	0	Unknown Metric	Unknown Metric
ROWs and Corridors	**Acres of Habitat currently authorized**	216,834	1.222%	In 2012: 1,168,629 Includes wind leases[OR-2], comm sites, corridors, transmission ≥115 kV	11.4% This is an over estimate.	66,588	0.5%	23,110	1.16%	5854 (Powerline all ownerships)	0.106%
	Projection of future development (RFDs)	Unknown	Unknown	1900 ac	Unknown future locations	0	0	0	0	Unknown	Unknown
Geothermal	**Acres of Habitat currently authorized**	465	.003%	45,501	.45%	25,571 (leased) 0 (developed)	0.2% (leased) 0 (developed)	0	0	500 (Federal)	0.009%
	Projection of future development	0	0	45,501	.45%	410	0.003%	0	0	35	

	(RFDs)										
Locatables	**Acres of Habitat currently authorized**	36,475	0.206%	89,120[OR-3]	.87%	13,260	0.12%	?	?	193 (Federal)	0.003%
	Projection of future development (RFDs)	22,800	0.13%	89,120	.87%	240	0.002%	?	?		

Acres of Habitat currently authorized – This is the acres that could be disturbed by development (the Footprint) of a current authorization.

Projected Future development – This is the acres that are in application in process, those deferred due to interim guidance, and those that could be projected based on historical development levels.

(1) data from previous WO300 data call
T:\OC\Wildlife\Transfers\Incoming\WO300_DataCall_StateSubmittals_Round2\NV\NV_WO300_data_call20120430.gdb\Notices_ProspectingApps

[OR-1] Suther recommends this reads "Acres authorized in proposed plan"

[OR-2] Acreage of Wind leases has dropped substantially. Will be re-calculated in next month.

[OR-3] Acres claimed.

Version: 9/5/2014

Table 2: Great Basin Existing Conditions/Projections of Future Development Direct Impacts
(These are initial estimates based on available information and projections. Refinement is expected.)

Resource Allocation		NV/CA		OR		ID		SW MT		UT	
		Acres	% Habitat	Acres	% Habitat	Acres	% Habitat	Acres	% Habitat	Acres	% Habitat
Solar	**Acres of Habitat currently authorized**	0	0	0	0	0	0	0	0	0	0
	Projection of future development (RFDs)	0	0	0	0	0	0	0	0	N/A	N/A
Wind	**Acres of Habitat currently authorized**	61,638	.347%	0	0	0	0	0	0	0	0
	Projection of future development (RFDs)	0	0	0	0	0	0	0	0	Excluded in PPMA = 0	0
ROWs	**Acres of Habitat currently authorized**	Assuming non-linear (Comm Towers and Railroads = 1,493	.008%	This is a duplicate line. Do not report here.	This is a duplicate line. Do not report here.	82,945	0.7%	18,900	1.0%	Assuming non-linear (Comm Towers and Railroads = 1027 (all ownership	0.019%

Draft Deliberative Internal Working Document – Do not disclose

										s)	
	Projection of future development (RFDs)	Unknown	Unknown	This is a duplicate line. Do not report here.	This is a duplicate line. Do not report here.					Unknown	unknown
Fluid Minerals	**Acres of Habitat currently authorized**	1,900	0.011%	42,342	.41%	4135 (leased) 0 (developed)	0.04% (leased) 0 (developed)	?	?	PPMA (federal) 513,410 leased; 43,408 HBP PGMA (federal) 282,851 leased; 164,272 HBP Total Estimated currently disturbed (all ownerships) = 32,793 (9,358 in PPMA)	PPMA (federal) 15.17% leased; 1.28% HBP PGMA (federal) 41.71% leased; 24.22% HBP Estimated disturbed = 0.807% (0.277% PPMA)
	Projection of future development (RFDs)	1,246	0.007%	42,342	.41%	20 (developed)	0.0002% (developed)	?	?	4,242 (all Federal)	0.104%

Version: 9/5/2014

Non-energy Leasable Minerals	**Acres of Habitat currently authorized**	61,425(1)	.346%	0	0	66 (leased)	0.0006%			5,362 (all ownership)	0.097%
	Projection of future development (RFDs)	0	0	0	0	66 (developed)	0.0006%			Unknown	unknown
Salable Minerals (Mineral Materials)	**Acres of Habitat currently authorized**	23,081	0.013%	FHWA ROW: 6,494 Mineral Material Pits: 4,496 Total Pit: 10,990 acres	FHWA ROW: 0.065% Mineral Material Pits: 0.045% Total Pit: 0.11%	12,000	0.1%	?	?	24,173 acres permitted 705 acres disturbed (federal)	0.013% disturbed
	Projection of future development (RFDs)	0	0	FHWA ROW: 6,494 Mineral Material Pits: 4,496 Total Pit: 10,990 acres	FHWA ROW: 0.065% Mineral Material Pits: 0.045% Total Pit: 0.11%	1500	0.01%	?	?	Unknown	unknown
Livestock Grazing	**Acres of Habitat currently authorized**	16,009,700	90.2%	9,983,278	98.7%	11,180,900	97.5%			3,254,000 (Federal)	97.1%
	Projection of future development (RFDs)	0	0	9,961,278	97.5%	0	0			Unknown Metric	Unknown Metric
Recreation	**Acres of**	Unknown		5,000	0	600	0.005%			Unknown	

	Habitat currently authorized	Metric		Does not include roads and trails						Metric	
	Projection of future development (RFDs)	n/a	n/a	0	0	25	0.0002%			n/a	n/a
Land Tenure	**Acres of Habitat currently authorized**	0	0	0	0	0	0	0	0	Unknown Metric	Unknown Metric
	Projection of future development (RFDs)	0	0	0	0	0	0	0	0	Unknown Metric	Unknown Metric
ROWs and Corridors	**Acres of Habitat currently authorized**	216,834	1.222%	In 2012: 1,168,629 Includes wind leases [OR-2], comm sites, corridors, transmission ≥115 kV	11.4% This is an over estimate.	66,588	0.5%	23,110	1.16%	5854 (Powerline all ownerships)	0.106%
	Projection of future development (RFDs)	Unknown	Unknown	1900 ac	Unknown future locations	0	0	0	0	Unknown	Unknown
Geothermal	**Acres of Habitat currently authorized**	465	.003%	45,501	.45%	25,571 (leased) 0 (developed)	0.2% (leased) 0 (developed)	0	0	500 (Federal)	0.009%
	Projection of future development	0	0	45,501	.45%	410	0.003%	0	0	35	

	(RFDs)										
Locatables	**Acres of Habitat currently authorized**	36,475	0.206%	89,120[OR-3]	.87%	13,260	0.12%	?	?	193 (Federal)	0.003%
	Projection of future development (RFDs)	22,800	0.13%	89,120	.87%	240	0.002%	?	?		

Acres of Habitat currently authorized – This is the acres that could be disturbed by development (the Footprint) of a current authorization.

Projected Future development – This is the acres that are in application in process, those deferred due to interim guidance, and those that could be projected based on historical development levels.

(1) data from previous WO300 data call
T:\OC\Wildlife\Transfers\Incoming\WO300_DataCall_StateSubmittals_Round2\NV\NV_WO300_data_call20120430.gdb\Notices_ProspectingApps

[**OR-1**] Suther recommends this reads "Acres authorized in proposed plan"

[OR-2] Acreage of Wind leases has dropped substantially. Will be re-calculated in next month.

[OR-3] Acres claimed.

Version: 9/5/2014

NVCA_PUB_3959
3.3
07/22/2015

Tague, Melvin (Joe) <jtague@blm.gov>

Table 2 - existing conditions and RFDs

8 messages

Ronald Baxter <ronald_baxter@fws.gov> Tue, Sep 9, 2014 at 12:18 PM
To: Ted Koch <ted_koch@fws.gov>
Cc: Carolyn Swed <carolyn_swed@fws.gov>, Joe Tague <jtague@blm.gov>

Ted: Here is the revised table which includes the percentages, and pulling out grazing and recreation from the other program areas.

On closer inspection, it shows that in 5 program areas Oregon has indicated there are identical (or almost identical) acreage (and percentages) for existing authorizations and RFDs. This could mean that either they are expecting absolutely no new development in these program areas, or that they are estimating the impacts to double. I have inquiries out now to clear this up. Similarly, Utah's numbers for fluid minerals seem out of whack – perhaps this is real, but it deserves some attention. As you can see, many of the data are still missing.

By way of this email, I am including Joe on this conversation in the hope that he could recirculate this table to 1) fill in any missing data, 2) address those issues mentioned above.

Ron

Ronald J. Baxter

Biologist (Endangered Species)

U.S, Fish and Wildlife Service

Nevada Fish and Wildlife Office

1340 Financial Blvd.

Reno, NV 89502

(phone) 775-861-6377

(cell) 951-237-8404

TEDS TABLE 2 SUMMARY NUMBERS.xlsx
17K

Melvin (Joe) Tague <jtague@blm.gov> Tue, Sep 9, 2014 at 2:42 PM
To: Quincy Bahr <qfbahr@blm.gov>, Joan Suther <jsuther@blm.gov>, Brent Ralston <bralston@blm.gov>

All,

Here is the final Table 2 we put together.

Joan – Please look at the Oregon information and answer Ron's questions as the number of existing and proposed were the same.

Quincy – Ron also had a question on your fluid minerals.

I am also including Table 1 for your info.

Joe

From: Ronald Baxter [mailto:ronald_baxter@fws.gov]
Sent: Tuesday, September 09, 2014 9:18 AM
To: Ted Koch
Cc: Carolyn Swed; Joe Tague
Subject: Table 2 - existing conditions and RFDs

Ted: Here is the revised table which includes the percentages, and pulling out grazing and recreation from the other program areas.

On closer inspection, it shows that in 5 program areas Oregon has indicated there are identical (or almost identical) acreage (and percentages) for existing authorizations and RFDs. This could mean that either they are expecting absolutely no new development in these program areas, or that they are estimating the impacts to double. I have inquiries out now to clear this up. Similarly, Utah's numbers for fluid minerals seem out of whack – perhaps this is real, but it deserves some attention. As you can see, many of the data are still missing.

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---

2 attachments

TEDS TABLE 2 SUMMARY NUMBERS.xlsx
17K

GREAT BASIN ALLOCATIONS ROLL-UP TABLE 1 - FINAL.docx
28K

Suther, Joan <jsuther@blm.gov> Tue, Sep 9, 2014 at 4:44 PM
To: "Melvin (Joe) Tague" <jtague@blm.gov>, "Rodriguez, Ron -FS" <rrodriguez01@fs.fed.us>
Cc: Quincy Bahr <qfbahr@blm.gov>, Brent Ralston <bralston@blm.gov>

Hi Joe - I talked with Ron to explain our minerals related numbers. Essentially we don't anticipate higher levels of development, and did not conduct RFD scenarios for this plan amendment - therefore little to no change. However, there has been a modicum of interest in fluid minerals, but no applications or pre-app mtgs, so difficult to gauge.

On Tue, Sep 9, 2014 at 11:42 AM, Melvin (Joe) Tague <jtague@blm.gov> wrote:

> All,
>
> Here is the final Table 2 we put together.
>
> Joan – Please look at the Oregon information and answer Ron's questions as the number of existing and proposed were the same.
>
> Quincy – Ron also had a question on your fluid minerals.
>
> I am also including Table 1 for your info.
>
> Joe

From: Ronald Baxter [mailto:ronald_baxter@fws.gov]
Sent: Tuesday, September 09, 2014 9:18 AM
To: Ted Koch
Cc: Carolyn Swed; Joe Tague
Subject: Table 2 - existing conditions and RFDs

Ted: Here is the revised table which includes the percentages, and pulling out grazing and recreation from the other program areas.

On closer inspection, it shows that in 5 program areas Oregon has indicated there are identical (or almost identical) acreage (and percentages) for existing authorizations and RFDs. This could mean that either they are expecting absolutely no new development in these program areas, or that they are estimating the impacts to double. I have inquiries out now to clear this up. Similarly, Utah's numbers for fluid minerals seem out of whack – perhaps this is real, but it deserves some attention. As you can see, many of the data are still missing.

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Ron

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U.S, Fish and Wildlife Service

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(phone) 775-861-6377

(cell) 951-237-8404

--
Joan Suther
Greater Sage-grouse Project Manager

Oregon Sub-region
541-573-4445 Office
541-589-0251 Cell
541-573-4411 Fax

Ronald Baxter <ronald_baxter@fws.gov> Tue, Sep 9, 2014 at 5:48 PM
To: Ted Koch <ted_koch@fws.gov>, Dennis Mackey <dennis_mackey@fws.gov>, Joe Tague <jtague@blm.gov>
Cc: Jason Pyron <jason_pyron@fws.gov>, Kathleen Hendricks <kathleen_hendricks@fws.gov>, Katie Powell <katie_powell@fws.gov>

Unless I'm mistaken, the "ROW" category refers to small ROWs (e.g., a road to someone's house) and permits, while the "ROW & Corridors" refers to large, utility-scale corridors and major pipelines.

Joe – is this correct?

Thxs,

R

Ronald J. Baxter

Biologist (Endangered Species)

U.S, Fish and Wildlife Service

Nevada Fish and Wildlife Office

1340 Financial Blvd.

Reno, NV 89502

(phone) 775-861-6377

(cell) 951-237-8404

From: Ted Koch [mailto:ted_koch@fws.gov]
Sent: Tuesday, September 09, 2014 2:44 PM
To: Mackey, Dennis
Cc: Jason Pyron; Kathleen Hendricks; Katie Powell; Baxter Ronald
Subject: Re: Table 2 - existing conditions and RFDs

Dennis-

Good question.

Ron?

Ted

Ted Koch

Nevada State Supervisor

U.S. Fish & Wildlife Service

1340 Financial Boulevard

Reno, NV. 89521

775-861-6300

On Sep 9, 2014, at 1:40 PM, "Mackey, Dennis" <dennis_mackey@fws.gov> wrote:

> Hi Ted:
>
> Thanks. This is helpful. It sounds like they are sorting out some of the same questions I had.
>
> I still have the question why there is a ROW category and a ROW & Corridor category.....are they double counting ROWs?
>
> We will continue to work on the narrative using the latest numbers, updated as they sort through and we get them.
>
> Thanks.
>
> Dennis
>
> On Tue, Sep 9, 2014 at 2:29 PM, Ted Koch <ted_koch@fws.gov> wrote:
>
> FYI
>
> Ted Koch
>
> Nevada State Supervisor
>
> U.S. Fish & Wildlife Service
>
> 1340 Financial Boulevard
>
> Reno, NV. 89521
>
> 775-861-6300
>
> Begin forwarded message:

From: Ronald Baxter <ronald_baxter@fws.gov>
Date: September 9, 2014 at 9:18:28 AM PDT
To: Ted Koch <ted_koch@fws.gov>
Cc: Carolyn Swed <carolyn_swed@fws.gov>, Joe Tague <jtague@blm.gov>
Subject: Table 2 - existing conditions and RFDs

Ted: Here is the revised table which includes the percentages, and pulling out grazing and recreation from the other program areas.

On closer inspection, it shows that in 5 program areas Oregon has indicated there are identical (or almost identical) acreage (and percentages) for existing authorizations and RFDs. This could mean that either they are expecting absolutely no new development in these program areas, or that they are estimating the impacts to double. I have inquiries out now to clear this up. Similarly, Utah's numbers for fluid minerals seem out of whack – perhaps this is real, but it deserves some attention. As you can see, many of the data are still missing.

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(cell) 951-237-8404

--

Dennis Mackey

Deputy State Supervisor

U.S. Fish and Wildlife Service

Boise, Idaho

Office: 208-378-5267

Cell: 208-860-1970

Bahr, Quincy <qfbahr@blm.gov> Tue, Sep 9, 2014 at 6:10 PM
To: "Melvin (Joe) Tague" <jtague@blm.gov>
Cc: Joan Suther <jsuther@blm.gov>, Brent Ralston <bralston@blm.gov>

Is the table supposed to show acres of actual disturbance, or acres where we don't have discretion? I heard both in Portland, so for fluid minerals, we presented total acres as following:

- acres leased (796,261 leased in PPMA and PGMA), where there are valid existing rights, but not anticipated development;
- acres that are leased AND held by production (207,680 leased in PPMA and PGMA) where the potential for a lease going away is less than just a plain old lease;
- acres that have actually been disturbed from O&G developments (32,793, only 9,358 of which are in PPMA)

The 4,242 acres of potential is tied specifically to acres of disturbance that are anticipated from future development, not future leases. As such, in order for current and future to be similar, the current number should be 9,358 acres, with 0.807% in the percentage column.

Similarly, for mineral materials, we provided acreages of both areas under a saleable permit (VER) AND the area of actual disturbance, thusly:

- acres where there is a valid permit granted, creating a valid existing right (24,173), not differentiated by type of saleable mineral (free-use, commercial, etc.)
- acres that have actually been disturbed by a backhoe, as mapped using aerial photography (705)

The percentage presented in the table (.013%) is based on the disturbed area, so the acreage should likely also be based on the actual disturbance in the acres column (705 acres).

It appears we need clarification in this table whether we are talking actual disturbance acreage, acres where the BLM/FS don't have a lot of discretion (i.e., where there's current VERs), or acres where there is potential (it was originally talked about, but doesn't appear to have been carried into any tables). Such clarification will be necessary to make sure the numbers are truely comparable and summarizable.

Q

On Tue, Sep 9, 2014 at 12:42 PM, Melvin (Joe) Tague <jtague@blm.gov> wrote:

> All,
>
> Here is the final Table 2 we put together.
>
> Joan – Please look at the Oregon information and answer Ron's questions as the number of existing and proposed were the same.
>
> Quincy – Ron also had a question on your fluid minerals.

> I am also including Table 1 for your info.
>
> Joe
>
> ---
>
> From: Ronald Baxter [mailto:ronald_baxter@fws.gov]
> Sent: Tuesday, September 09, 2014 9:18 AM
> To: Ted Koch
> Cc: Carolyn Swed; Joe Tague
> Subject: Table 2 - existing conditions and RFDs
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> Ted: Here is the revised table which includes the percentages, and pulling out grazing and recreation from the other program areas.
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>
> Ronald J. Baxter
>
> Biologist (Endangered Species)
>
> U.S, Fish and Wildlife Service
>
> Nevada Fish and Wildlife Office
>
> 1340 Financial Blvd.
>
> Reno, NV 89502
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> (phone) 775-861-6377
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> (cell) 951-237-8404

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Quincy Bahr
Project Manager – Greater Sage-Grouse LUP Amendments, Utah Sub-Region
Planning and Environmental Coordinator – BLM, Utah State Office
440 West 200 South, Suite 500
Salt Lake City, UT 84101-1345
801-539-4122 (office)
801-518-1479 (cell)
qfbahr@blm.gov

Melvin (Joe) Tague <jtague@blm.gov> Tue, Sep 9, 2014 at 6:49 PM
To: Ronald Baxter <ronald_baxter@fws.gov>

Didn't see that you got this.

From: Bahr, Quincy [mailto:qfbahr@blm.gov]
Sent: Tuesday, September 09, 2014 3:10 PM
To: Melvin (Joe) Tague
Cc: Joan Suther; Brent Ralston
Subject: Re: FW: Table 2 - existing conditions and RFDs

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Joan – Please look at the Oregon information and answer Ron's questions as the number of existing and proposed were the same.

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Sent: Tuesday, September 09, 2014 9:18 AM
To: Ted Koch
Cc: Carolyn Swed; Joe Tague
Subject: Table 2 - existing conditions and RFDs

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Ron

Ronald J. Baxter

Biologist (Endangered Species)

U.S, Fish and Wildlife Service

Nevada Fish and Wildlife Office

1340 Financial Blvd.

Reno, NV 89502

(phone) 775-861-6377

(cell) 951-237-8404

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Quincy Bahr
Project Manager – Greater Sage-Grouse LUP Amendments, Utah Sub-Region
Planning and Environmental Coordinator – BLM, Utah State Office
440 West 200 South, Suite 500

Salt Lake City, UT 84101-1345
801-539-4122 (office)
801-518-1479 (cell)
qfbahr@blm.gov

Suther, Joan <jsuther@blm.gov> Tue, Sep 9, 2014 at 7:12 PM
To: Ronald Baxter <ronald_baxter@fws.gov>, "Melvin (Joe) Tague" <jtague@blm.gov>

Hi Ron - here are a couple of assumptions made by our geologist as he calculated acres of mining claims:

1. Each claim was given a value of 160 acres; while it could encompass as little as 5 or less acres.
2. If any part of a claim could have been in PPH or PGH, the entire claim was counted in.

I believe this grossly overestimates the actual acreage of claims on sage-grouse habitat, by 4 or 5 times. I would recommend using approximately 20,000 ac currently authorized. We simply do not have the mining claims data available in a very spatially explicit format - unfortunate for this process.

Please contact me with any questions. J.

---------- Forwarded message ----------
From: Melvin (Joe) Tague <jtague@blm.gov>
Date: Tue, Sep 9, 2014 at 11:42 AM
Subject: FW: Table 2 - existing conditions and RFDs
To: Quincy Bahr <qfbahr@blm.gov>, Joan Suther <jsuther@blm.gov>, Brent Ralston <bralston@blm.gov>

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Sent: Tuesday, September 09, 2014 9:18 AM
To: Ted Koch
Cc: Carolyn Swed; Joe Tague
Subject: Table 2 - existing conditions and RFDs

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--
Joan Suther
Greater Sage-grouse Project Manager
Oregon Sub-region
541-573-4445 Office
541-589-0251 Cell
541-573-4411 Fax

Baxter, Ronald <ronald_baxter@fws.gov> Wed, Sep 10, 2014 at 12:49 PM
To: Joe Tague <jtague@blm.gov>

Hi Joe: Take a look at this email - I think Ted would like Jesse and Dennis in on this....

Thxs,
R

---------- Forwarded message ----------
From: Ted Koch <ted_koch@fws.gov>
Date: Wed, Sep 10, 2014 at 8:14 AM
Subject: FW: FW: FW: Table 2 - existing conditions and RFDs
To: Dennis Mackey <dennis_mackey@fws.gov>, Jesse DElia <jesse_delia@fws.gov>
Cc: Ronald Baxter <ronald_baxter@fws.gov>

Dennis and Jesse-

FYI - Ron has learned of potential inter-state discrepancies in how data are rolled up in the Great Basin resource allocation effects table (see below). He and I will discuss, but I'd like the involvement of you two, especially since I am out next week.

Thanks,

Ted

Ted Koch

Nevada State Supervisor

U.S. Fish and Wildlife Service

1340 Financial Boulevard

Reno, Nevada 89502

775-861-6300

From: Baxter, Ronald [mailto:ronald_baxter@fws.gov]
Sent: Wednesday, September 10, 2014 7:26 AM
To: Ted Koch
Subject: Fwd: FW: FW: Table 2 - existing conditions and RFDs

Good morning! Could you take a look at the comments by Quincy? He brings up good points, but what concerns me is that the different states may be listing different kinds of information (actual disturbance vs. actual leases, etc.). Let me know your thoughts when you get a chance....

R

---------- Forwarded message ----------
From: Melvin (Joe) Tague <jtague@blm.gov>
Date: Tue, Sep 9, 2014 at 3:49 PM
Subject: FW: FW: Table 2 - existing conditions and RFDs
To: Ronald Baxter <ronald_baxter@fws.gov>

Didn’t see that you got this.

From: Bahr, Quincy [mailto:qfbahr@blm.gov]
Sent: Tuesday, September 09, 2014 3:10 PM
To: Melvin (Joe) Tague
Cc: Joan Suther; Brent Ralston
Subject: Re: FW: Table 2 - existing conditions and RFDs

Is the table supposed to show acres of actual disturbance, or acres where we don't have discretion? I heard both in Portland, so for fluid minerals, we presented total acres as following:

- acres leased (796,261 leased in PPMA and PGMA), where there are valid existing rights, but not anticipated development;
- acres that are leased AND held by production (207,680 leased in PPMA and PGMA) where the potential for a lease going away is less than just a plain old lease;
- acres that have actually been disturbed from O&G developments (32,793, only 9,358 of which are in PPMA)

The 4,242 acres of potential is tied specifically to acres of disturbance that are anticipated from future development, not future leases. As such, in order for current and future to be similar, the current number should be 9,358 acres, with 0.807% in the percentage column.

Similarly, for mineral materials, we provided acreages of both areas under a saleable permit (VER) AND the area of actual disturbance, thusly:

- acres where there is a valid permit granted, creating a valid existing right (24,173), not differentiated by type of saleable mineral (free-use, commercial, etc.)
- acres that have actually been disturbed by a backhoe, as mapped using aerial photography (705)

The percentage presented in the table (.013%) is based on the disturbed area, so the acreage should likely also be based on the actual disturbance in the acres column (705 acres).

It appears we need clarification in this table whether we are talking actual disturbance acreage, acres where the BLM/FS don't have a lot of discretion (i.e., where there's current VERs), or acres where there is potential (it was originally talked about, but doesn't appear to have been carried into any tables). Such clarification will be necessary to make sure the numbers are truely comparable and summarizable.

Q

On Tue, Sep 9, 2014 at 12:42 PM, Melvin (Joe) Tague <jtague@blm.gov> wrote:

All,

Here is the final Table 2 we put together.

Joan – Please look at the Oregon information and answer Ron's questions as the number of existing and proposed were the same.

Quincy – Ron also had a question on your fluid minerals.

I am also including Table 1 for your info.

Joe

From: Ronald Baxter [mailto:ronald_baxter@fws.gov]
Sent: Tuesday, September 09, 2014 9:18 AM
To: Ted Koch
Cc: Carolyn Swed; Joe Tague
Subject: Table 2 - existing conditions and RFDs

Ted: Here is the revised table which includes the percentages, and pulling out grazing and recreation from the other program areas.

On closer inspection, it shows that in 5 program areas Oregon has indicated there are identical (or almost identical) acreage (and percentages) for existing authorizations and RFDs. This could mean that either they are expecting absolutely no new development in these program areas, or that they are estimating the impacts to double. I have inquiries out now to clear this up. Similarly, Utah's numbers for fluid minerals seem out of whack – perhaps this is real, but it deserves some attention. As you can see, many of the data are still missing.

By way of this email, I am including Joe on this conversation in the hope that he could recirculate this table to 1) fill in any missing data, 2) address those issues mentioned above.

Ron

Ronald J. Baxter

Biologist (Endangered Species)

U.S, Fish and Wildlife Service

Nevada Fish and Wildlife Office

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Reno, NV 89502

(phone) 775-861-6377

(cell) 951-237-8404

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Quincy Bahr
Project Manager – Greater Sage-Grouse LUP Amendments, Utah Sub-Region
Planning and Environmental Coordinator – BLM, Utah State Office

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NFWO

Existing Rights Reasonably Foreseeable Development
SUMMARY
Great Basin Sub-Region

Table 2. Great Basin Existing Conditions / Projections of Future Development - Direct Impacts

(Initial estimates only based on available information - refinment of these values is expected)

Programs Generally Incompatible with Sage-Grouse Conservation

		NV/CA - Acres	%	OR - Acres	%	ID - Acres	%	SW MT - Acres	%	UT - Acres	%	TOTALS:
SOLAR	**Currently Authorized**	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	**0**
	RFD	0	0.000	0	0.000	0	0.000	0	0.000	▨	▨	**0**
WIND	**Currently Authorized**	61,638	0.347	0	0.000	0	0.000	0	0.000	0	0.000	**61,638**
	RFD	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	**0**
ROWs	**Currently Authorized**	1,493	0.008	▨	▨	82,945	0.700	18,900	1.000	1,027	0.019	**104,367**
	RFD	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	**0**
FLUID MINERALS	**Currently Authorized**	1,900	0.011	42,342	0.410	4,135	0.040	▨	▨	796,261	20*	**844,638**
	RFD	1,246	0.007	42,342	0.410	20	0.000	▨	▨	4,242	0.104	**47,850**
NON-ENERGY LEASABLES	**Currently Authorized**	61,425	0.346	0	0.000	66	0.000	▨	▨	5,362	0.097	**66,853**
	RFD	0	0.000	0	0.000	66	0.000	▨	▨	▨	▨	**66**
SALABLE MINERALS	**Currently Authorized**	23,081	0.013	10,990	0.065	12,000	0.100	▨	▨	24,173	0.013	**70,244**
	RFD	0	0.000	10,990	0.065	1,500	0.010	▨	▨	▨	▨	**12,490**
ROWs & CORRIDORS	**Currently Authorized**	216,834	1.222	1,168,629	11.400	66,588	0.500	23,110	1.160	5,854	0.106	**1,481,029**
	RFD	▨	▨	1,900	▨	▨	▨	▨	▨	▨	▨	**1,900**
GEOTHERMAL	**Currently Authorized**	465	0.003	45,501	0.450	25,571	0.200	0	0.000	500	0.009	**72,038**
	RFD	0	0.000	45,501	0.450	410	0.003	0	0.000	4	▨	**45,915**
LOCATABLES	**Currently Authorized**	36,475	0.206	89,120	0.870	13,260	0.120	▨	▨	193	0.003	**139,049**
	RFD	22,800	0.130	89,120	0.870	240	0.002	▨	▨	▨	▨	**112,161**
	TOTALS:	**427,357**	**2.293**	**1,546,435**	**15**	**206,801**	**2**	**42,010**	**2**	**837,616**		**3,060,240**

*** Value approximate - based on average of PPMA &PGMA percentages**

Progams Not Necessarily Incompatible with Sage-Grouse Conservation

		NV/CA - Acres	%	OR - Acres	%	ID - Acres	%	SW MT - Acres	%	UT - Acres	%	TOTALS:
LIVESTOCK GRAZING	**Currently Authorized**	16,009,700	90.200	9,983,278	98.700	11,180,900	97.500	▨	▨	3,254,000	97.100	**40,428,164**
	RFD	0	0.000	9,961,278	97.500	0	0.000	▨	▨	▨	▨	**9,961,376**
RECREATION	**Currently Authorized**	▨	▨	5,000	▨	600	0.005	▨	▨	▨	▨	**5,600**
	RFD	▨	▨	▨	▨	25	0.000	▨	▨	▨	▨	**25**
	TOTALS:	**16,009,700**	**90.200**	**19,949,556**	**196.200**	**11,181,525**	**97.505**	▨	▨	**3,254,000**	**97.100**	**50,395,165**

Data not currently available = ▨

Existing Rights Reasonably Foreseeable Development
SUMMARY
Great Basin Sub-Region

Table 2. Great Basin Existing Conditions / Projections of Future Development - Direct Impacts

(Initial estimates only based on available information - refinment of these values is expected)

Programs Generally Incompatible with Sage-Grouse Conservation

		NV/CA - Acres	%	OR - Acres	%	ID - Acres	%	SW MT - Acres	%	UT - Acres	%	TOTALS:
SOLAR	**Currently Authorized**	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	**0**
	RFD	0	0.000	0	0.000	0	0.000	0	0.000	▨	▨	**0**
WIND	**Currently Authorized**	61,638	0.347	0	0.000	0	0.000	0	0.000	0	0.000	**61,638**
	RFD	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	**0**
ROWs	**Currently Authorized**	1,493	0.008	▨	▨	82,945	0.700	18,900	1.000	1,027	0.019	**104,367**
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FLUID MINERALS	**Currently Authorized**	1,900	0.011	42,342	0.410	4,135	0.040	▨	▨	796,261	20*	**844,638**
	RFD	1,246	0.007	42,342	0.410	20	0.000	▨	▨	4,242	0.104	**47,850**
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	RFD	0	0.000	0	0.000	66	0.000	▨	▨	▨	▨	**66**
SALABLE MINERALS	**Currently Authorized**	23,081	0.013	10,990	0.065	12,000	0.100	▨	▨	24,173	0.013	**70,244**
	RFD	0	0.000	10,990	0.065	1,500	0.010	▨	▨	▨	▨	**12,490**
ROWs & CORRIDORS	**Currently Authorized**	216,834	1.222	1,168,629	11.400	66,588	0.500	23,110	1.160	5,854	0.106	**1,481,029**
	RFD	▨	▨	1,900	▨	▨	▨	▨	▨	▨	▨	**1,900**
GEOTHERMAL	**Currently Authorized**	465	0.003	45,501	0.450	25,571	0.200	0	0.000	500	0.009	**72,038**
	RFD	0	0.000	45,501	0.450	410	0.003	0	0.000	4	▨	**45,915**
LOCATABLES	**Currently Authorized**	36,475	0.206	89,120	0.870	13,260	0.120	▨	▨	193	0.003	**139,049**
	RFD	22,800	0.130	89,120	0.870	240	0.002	▨	▨	▨	▨	**112,161**
	TOTALS:	**427,357**	**2.293**	**1,546,435**	**15**	**206,801**	**2**	**42,010**	**2**	**837,616**		**3,060,240**

*** Value approximate - based on average of PPMA &PGMA percentages**

Progams Not Necessarily Incompatible with Sage-Grouse Conservation

LIVESTOCK GRAZING	**Currently Authorized**	16,009,700	90.200	9,983,278	98.700	11,180,900	97.500	▨	▨	3,254,000	97.100	**40,428,164**
	RFD	0	0.000	9,961,278	97.500	0	0.000	▨	▨	▨	▨	**9,961,376**
RECREATION	**Currently Authorized**	▨	▨	5,000	▨	600	0.005	▨	▨	▨	▨	**5,600**
	RFD	▨	▨	▨	▨	25	0.000	▨	▨	▨	▨	**25**
	TOTALS:	**16,009,700**	**90.200**	**19,949,556**	**196.200**	**11,181,525**	**97.505**	▨	▨	**3,254,000**	**97.100**	**50,395,165**

Data not currently available = ▨

TABLE 1: GREAT BASIN SUMMARY OF ALLOCATIONS						
ALLOCATION	HABITAT	NV-CA[NV-3.]	OR	ID	SW MT	UT (BLM)
SOLAR	PPMA (Core)	Exclusion [NV-1]	Exclusion	Exclusion	Exclusion	Exclusion
	Important			Avoidance		
	PGMA	Exclusion [NV-1]	Avoidance	Open	Open	Exclusion
WIND	PPMA (Core)	Exclusion [NV-1]	Exclusion	Exclusion	Exclusion	Exclusion
	Important			Avoidance		
	PGMA	Exclusion [NV-1]	Avoidance	Open	Open	Varies [UT-1]
ROW						
UTILITY COORIDORS	PPMA (Core)	Open (existing) [NV-2]	Open	Open	Open	Open [UT-2]
	Important			Open	Open	
	PGMA	Open (existing) [NV-2]	Open	Open	Open	Open [UT-2]
HIGH-VOLTAGE / MAJOR PIPELINES	PPMA (Core)	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance
	Important			Avoidance		
	PGMA	Avoidance	Avoidance	Open	Open	Varies [UT-1]
OTHER (MINOR) ROWs & PERMITS	PPMA (Core)	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance
	Important			Avoidance		
	PGMA	Avoidance	Open	Open	Open	Varies [UT-1]

FLUID MINERALS (includes GEOTHERMAL)	PPMA (Core)	NSO (with single NPT Exception)	NSO (with single NPT Exception)	NSO (with single NPT Exception)	NSO (with single NPT Exception)	NSO (BLM with 3 specific exceptions)
	Important			NSO (with single NPT Exception)		
	PGMA	NSO (with waivers, modifications, stipulations)	Open w/1 mi NSO around leks + CSU, TL	Open with CSU and TL	Open with CSU and TL	Varies [UT-1]
NON-ENERGY LEASABLES	PPMA (Core)	Closed	Closed	Closed	Closed	Closed [UT-3]
	Important			Open		
	PGMA	Closed	Open	Open	Open	Varies [UT-1]
SALABALE MINERALS	PPMA (Core)	Closed (expansion OK with mitigation, RDFs, and within Cap. Free use OK)	Closed (limited expansion for Federal Highway ROWs with mitigation and other stipulations)	Closed to new sites (existing sites open)	Closed to new sites (existing sites open)	Closed (expansion and new free-use sites OK, though not within 1 mile of a lek, and they require mitigation, RDFs, be within the cap, and other stipulations)
	Important			Closed to new sites (existing sites open)		
	PGMA	Closed	Open	Open	Open	Varies [UT-1]
RECREATION (TRAVEL MANAGEMENT)	PPMA (Core)	Limited To Existing Routes	Limited To Existing Routes	Limited To Existing Routes	Limited to Designated Routes [ID-SW MT-1]	Limited to existing routes (where not already closed or limited to designated routes)
	Important			Limited To Existing Routes		
	PGMA	Limited To Existing Routes	Limited To Existing Routes	Limited To Existing Routes	Limited to Designated Routes [ID-SW MT-1]	Limited to existing routes (where not already closed or limited to designated routes)

LOCATABLE MINERALS	PPMA (Core)	Open [NV-3]	Open[OR-1] direction to work with claimant to implement various measures to avoid, minimize, or mitigate impacts	Open	Open	Open (direction to work with claimant to implement various measures to avoid, minimize, or mitigate impacts)
	Important			Open		
	PGMA	Open [NV-3]	Open [OR-1]	Open	Open	Varies [UT-1]

Footnotes:

[NV-1] Use of solar and wind to power existing facilities OK if no impacts to GRSG or habitat is documented.

[NV-2] No new utility corridors allowed; some wide corridors reduced to maximum width of 3500 feet.

[NV-3] All disturbances to GRSG habitat must follow State of Nevada avoid-minimize-mitigate procedures to attain no net unmitigated loss of habitat.

[UT-1] PGMA is for BLM-UT is managed according to the existing LUP allocations (O&G- open, CSU, NSO, closed; ROWs: open, avoidance, exclusion, mineral materials and non-energy leasables: open, closed; other allocations: etc.). In addition to whatever the existing LUP includes, there is an added requirement for no net unmitigated loss of GRSG habitat that would be applied to both PPMA and PGMA.

[UT-2] Several new ROW corridors were identified in the ADPP as a mean to focus future development from collocating with any existing line on the landscape to be located in areas where they would do less damage to GRSG. Additionally, the decision in the ADPP for ROW corridors is to avoid GRSG habitat entirely, if possible, but if that is not feasible, to locate in the corridors and apply a variety of other stipulations to minimize impacts, including mitigation.

[UT-3] Per NPT, closed unless adjacent to existing operations, where it could be allowed with mitigation and within the disturbance cap. Utah went further and wouldn't allow expansion within 1 mile of lek, and would require mitigation to be completed before the project is initiated, as well as other stipulations such as to eliminate impacts from noise and tall structures.

[OR-1] Open except where closed in existing plans

[ID-SW MT-1] Southwest Montana BLM areas have already completed travel management planning and identified designated roads and trails.

From:	Mermejo, Lauren <lmermejo@blm.gov>
Sent:	Friday, August 14, 2015 3:17 PM
To:	nvca sagegrouse
Subject:	Fwd: Cooperating Agency Early Letter
Attachments:	Cooperating Agency Early Letter.doc

---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Wed, Apr 22, 2015 at 2:33 PM
Subject: Cooperating Agency Early Letter
To: jmbeck@blm.gov, Joan Suther <jsuther@blm.gov>, Jessica Rubado <jarubado@blm.gov>, Quincy Bahr <qfbahr@blm.gov>, John Carlson <jccarlso@blm.gov>, Pamela Murdock <pmurdock@blm.gov>, Erin Jones <erjones@blm.gov>
Cc: mdillon@fs.fed.us, Stephanie Carman <scarman@blm.gov>

Here is a copy of the letter that Nevada is sending out today, if you want to use it.

Stephanie gave the OK…we are good to go.

Lauren

--
Lauren L. Mermejo
Great Basin Greater Sage-Grouse Project Mgr.
BLM, Nevada State Office
775 861-6580

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Nevada State Office
1340 Financial Boulevard
Reno, Nevada 89502-7147
http://www.blm.gov/nv

In Reply Refer To:
1610 (NV930)

Dear Cooperating Agency:

Thank you for your continued interest in the *Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment*. As you are aware, the Bureau of Land Management (BLM) is in the midst of an unprecedented land use planning effort. The BLM is preparing 15 Environmental Impact Statements and amending or revising 68 land use plans for the conservation of the Greater Sage-Grouse. We anticipate completing the planning process this summer. As a cooperating agency, the Bureau of Land Management will be providing you an administrative draft of the *Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment* (ADPP) during the week of April 29 for a two week review. Please provide comments, per your responsibility under our Memorandum of Understanding, within two weeks of receipt.

Sincerely,

John F. Ruhs
Acting State Director

NVCA_PUB_4741
8.2
10/13/2015

From: Mermejo, Lauren [lmermejo@blm.gov]
Sent: Tuesday, September 29, 2015 2:14 PM
To: nvca sagegrouse
Subject: Fwd: Rights-of-Way Data Layers for NOC Roll-Up

---------- Forwarded message ----------
From: **Lauren Mermejo** <lmermejo@blm.gov>
Date: Wed, May 21, 2014 at 3:15 PM
Subject: Rights-of-Way Data Layers for NOC Roll-Up
To: Quincy Bahr <qfbahr@blm.gov>, "Suther, Joan" <jsuther@blm.gov>, "Melvin (Joe) Tague" <jtague@blm.gov>, Brent Ralston <bralston@blm.gov>
Cc: Matthew Magaletti <mmagalet@blm.gov>

Hi All – Please coordinate with your GIS folks on the clarification items below……..

There were a few questions from Oregon on how to map a number of the ROW data layers to send to the NOC – and to ensure that we are doing it consistently for the "Roll-Up".

As a reminder, there are four data layers pertaining to ROWs going forward for the roll-up. These are:

1. Designated Corridors – displayed as "Open" as per WO guidance

2. Wind - PPMA displayed as Exclusion; PGMA displayed as either Exclusion or Avoidance as per WO guidance

3. Solar - PPMA displayed as Exclusion; PGMA displayed as either Exclusion or Avoidance as per WO guidance

4. ROW (the data layer for High Voltage Transmission Lines and Major Pipeline) – displayed as all Avoidance for PPMA and PGMA as per WO guidance

So….Based off of the guidance that the Designated Corridor layer would show as 'open' to ROWs:

1. When mapping the Wind and Solar data layers as exclusion in PPMA, and/or exclusion or avoidance in PGMA – should the Designated Corridor layer of "open" be shown on those exclusion maps?

> Response: NO – the data layers for Wind and Solar are exclusion and/or avoidance, no matter what the Designated Corridor map shows. We would NOT

> provide a ROW grant for wind or solar in PPMA under any circumstances under an exclusion, and probably never even under an avoidance in PGMA. The designated corridors have nothing to do with the wind and solar allocations.

2. When mapping the high voltage transmission or major pipeline ROWs data layer for submission to the NOC – all PPMA and PGMA would be displayed as avoidance (in accordance with the WO guidance). Should the Designated Corridors be eliminated from that data layer because they are “open”?

> Response: YES – in effect, you are showing that high voltage transmission or major pipeline ROWs are avoidance areas in PPMA and PGMA, but could be considered more readily in the open designated corridors. Remember that this is the ONLY real “ROW” layer that we are sending forward….we are not forwarding the “general ROWs” layer in the WO guidance.

If you have any questions, please give me a call. Thanks…and thanks to Oregon for bringing up these questions. We need to get it right the first time, cuz we won’t have time to redo!!

Lauren L. Mermejo

Great Basin GRSG Project Manager

BLM Nevada State Office

775 861-6580 (Office)

775 223-2770 (Cell)

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Lauren L. Mermejo
Great Basin Greater Sage-Grouse Project Mgr.
BLM, Nevada State Office
775 861-6580