Biological Science Competency Model

GS-0401 Natural Resource Management and Biological Sciences

GS-0408 Ecology

GS-0430 Botany

GS-0454 Rangeland Management

GS-0460 Forestry

GS-0480 Fish & Wildlife Administration

GS-0482 Fish Biology

GS-0485 Wildlife Refuge Management

GS-0486 Wildlife Biology

GS-0499 Biological Science Student Trainee

U.S. Department of the Interior

Office of Human Capital

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Biological Science Competency Model

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Biological Science Competency Model Study Summary

The DOI Office of Human Capital (OHC) conducted a comprehensive study to identify the critical competencies and tasks for successful performance of biological sciences work across the Department. OHC worked with biological science subject matter experts from across the Department in order to create a thorough and accurate representation of the work performed by DOI biological scientists and the knowledge, skills, and abilities required to perform that work. The approach used for this project allowed for the examination of multiple occupations at the same time. The occupations included in the study were:

- GS-0401 Natural Resources Management and Biological Sciences
- GS-0408 Ecology
- GS-0430 Botany
- GS-0454 Rangeland Management
- GS-0460 Forestry
- GS-0480 Fish and Wildlife Administration
- GS-0482 Fish Biology
- GS-0485 Wildlife Refuge Management
- GS-0486 Wildlife Biology
- GS-0499 Biological Science Student Trainee

The study involved a variation of the U.S. Office of Personnel Management's Multipurpose Occupational Systems Analysis Inventory – Closed-Ended (MOSAIC) method for gathering and analyzing information about work. The MOSAIC approach has been utilized to study and describe work performed within the Federal Government for over 25 years. The study included a wide-ranging literature review to build lists of tasks and competencies used to describe biological science work across the Department. Next, focus groups with DOI biological science subject matter experts were held to ensure these lists were complete and accurately represented the job. A trained job analyst also linked each task to duties and competencies to each duty to confirm they were required to perform the work. DOI biological scientists rated the duties and competencies to demonstrate the importance and utility of each component of the study. Finally, biological science subject matter experts reviewed the results of the study to ensure its accuracy.

The results of this study establish a common set of biological science tasks, duties, and competencies across the Department, which can be used to create assessment and selection techniques and tools and establish common practices and terminology for recruitment, performance management, workforce planning, training, and employee development. This work provides DOI with current, validated information that can be used to ensure its biological science workforce has the tools to meet future challenges.

Please reference the Competency Model Interpretive Guidance for assistance in interpreting and applying the results of this study.

Table 1: General Competencies by Grade[1]

The following general competencies are valid for assessment and selection, performance management, and other related human capital functions across the biological science occupational series included in this study at the grade levels listed below.

GS-5	GS-7	GS-9	GS-11
• *Integrity/Honesty* • *Interpersonal Skills* • *Teamwork*	• *Attention to Detail* • *Flexibility* • Integrity/Honesty • Interpersonal Skills • Teamwork	• *Accountability* • Attention to Detail • Flexibility • Integrity/Honesty • Interpersonal Skills • *Oral Communication* • *Problem Solving* • *Reasoning* • Teamwork • *Technical Competence** • *Writing*	• Accountability • Attention to Detail • *Compliance* • *Creative Thinking* • *Customer Service* • Flexibility • Integrity/Honesty • Interpersonal Skills • Oral Communication • Problem Solving • Reasoning • Teamwork • Technical Competence • Writing
GS-12	**GS-13**	**GS-14**	**GS-15**
• Accountability • Attention to Detail • Compliance • Creative Thinking • Customer Service • *Entrepreneurship* • Flexibility • *Influencing/ Negotiating* • Integrity/Honesty • Interpersonal Skills • Oral Communication • *Organizational Awareness* • *Partnering* • Problem Solving	• Accountability • Attention to Detail • Compliance • Creative Thinking • Customer Service • Entrepreneurship • Flexibility • Influencing/ Negotiating • Integrity/Honesty • Interpersonal Skills • Oral Communication • Organizational Awareness • Partnering • Problem Solving	• Accountability • Attention to Detail • Compliance • Creative Thinking • Customer Service • Entrepreneurship • Flexibility • Influencing/ Negotiating • Integrity/Honesty • Interpersonal Skills • Oral Communication • Organizational Awareness • Partnering • Problem Solving	• Accountability • Attention to Detail • Compliance • Creative Thinking • Customer Service • Entrepreneurship • Flexibility • Influencing/ Negotiating • Integrity/Honesty • Interpersonal Skills • Oral Communication • Organizational Awareness • Partnering • Problem Solving

[1] Italics represent the lowest grade at which the competency appears.

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• *Project Management* • Reasoning • Teamwork • Technical Competence • Writing	• Project Management • Reasoning • Teamwork • Technical Competence • Writing	• Project Management • Reasoning • Teamwork • Technical Competence • Writing	• Project Management • Reasoning • Teamwork • Technical Competence • Writing

Table 2: Required Proficiency Levels by Grade Level

Proficiency Level Scale Definitions		
Proficiency Level	**General Competencies**	**Technical Competencies**
5 = Expert	• Applies the competency in exceptionally difficult situations • Serves as a key resource and advises others	• Applies the competency in exceptionally difficult situations • Serves as a key resource and advises others • Demonstrates comprehensive expert understanding of concepts and processes
4 = Advanced	• Applies the competency in considerably difficult situations • Generally requires little or no guidance	• Applies the competency in considerably difficult situations • Generally requires little or no guidance • Demonstrates understanding of concepts and processes
3 = Intermediate	• Applies the competency in difficult situations • Requires occasional guidance	• Applies the competency in difficult situations • Requires occasional guidance • Demonstrates understanding of concepts and processes
2 = Basic	• Applies the competency in somewhat difficult situations • Requires frequent guidance	• Applies the competency in somewhat difficult situations • Requires frequent guidance • Demonstrates familiarity with concepts and processes
1 = Awareness	• Applies the competency in simplest situations • Requires close and extensive guidance	• Applies the competency in simplest situations • Requires close and extensive guidance • Demonstrates awareness of concepts and processes

Table 2: Required Proficiency Levels of General Competencies[2]								
	GS-5	GS-7	GS-9	GS-11	GS-12	GS-13	GS-14	GS-15
Accountability	**2**	**2**	**3**	**3**	**4**	**5**	**5**	**5**
Attention to Detail	**2**	**3**	**3**	**3**	**4**	**5**	**5**	**5**
Compliance	**1**	**2**	**2**	**3**	**4**	**5**	**5**	**5**
Creative Thinking	**2**	**2**	**2**	**3**	**4**	**5**	**5**	**5**
Customer Service	**2**	**2**	**3**	**3**	**4**	**4**	**5**	**5**
Entrepreneurship	**1**	**1**	**2**	**2**	**3**	**4**	**4**	**5**
Flexibility	**2**	**3**	**3**	**4**	**4**	**5**	**5**	**5**
Influencing/Negotiating	**1**	**1**	**2**	**3**	**4**	**5**	**5**	**5**
Integrity/Honesty	**3**	**3**	**4**	**4**	**5**	**5**	**5**	**5**
Interpersonal Skills	**3**	**3**	**4**	**4**	**4**	**5**	**5**	**5**
Oral Communication	**2**	**2**	**3**	**4**	**5**	**5**	**5**	**5**
Organizational Awareness	**1**	**2**	**2**	**3**	**4**	**5**	**5**	**5**
Partnering	**1**	**1**	**2**	**3**	**4**	**4**	**5**	**5**
Problem Solving	**2**	**2**	**3**	**4**	**5**	**5**	**5**	**5**
Project Management	**1**	**1**	**2**	**3**	**4**	**5**	**5**	**5**
Reasoning	**2**	**2**	**3**	**4**	**4**	**5**	**5**	**5**
Teamwork	**3**	**3**	**4**	**4**	**5**	**5**	**5**	**5**
Technical Competence	**1**	**2**	**3**	**4**	**5**	**5**	**5**	**5**
Writing	**2**	**2**	**3**	**4**	**5**	**5**	**5**	**5**

[2] Bolded competencies are validated for use for assessment and selection purposes.

Table 3: Behavioral Examples for Competencies

Competency Name	Definitions
Accountability	**Holds self and others accountable for measurable high-quality, timely, and cost-effective results. Determines objectives, sets priorities, and delegates work. Accepts responsibility for mistakes. Complies with established control systems and rules.** • *Takes responsibility for results and work products* • *Ensures work is completed on time and at the level of quality required* • *Understands the rules and regulations of the work performed and ensures compliance with them* • *Demonstrates responsibility with important materials, critical processes, or confidential information*
Attention to Detail	**Is thorough when performing work and conscientious about attention to detail. Recalls information that has been presented previously.** • *Sets the standards for the quality of the work completed for the organization* • *Leads others in attending to detail in difficult and/or high-pressure circumstances* • *Reviews and edits work completed by others to ensure that the quality of work meets acceptable work standards* • *Independently completes thorough and accurate work*
Compliance	**Knowledge of procedures for assessing, evaluating, and monitoring programs or projects for compliance with Federal laws, regulations, and guidance.** • *Shows familiarity with the structure and terminology of various rules and regulations of the Federal Government* • *Demonstrates the ability to search for and find appropriate rules or regulations* • *Understands how to apply appropriate rules and regulations to guide direction of work or make decisions*
Creative Thinking	**Uses imagination to develop new insights into situations and applies innovative solutions to problems; designs new methods where established methods and procedures are inapplicable or are unavailable.** • *Creates a work environment that encourages creative thinking and innovation* • *Explores new ideas, methodologies, and alternatives to reach outcomes* • *Introduces new concepts or strategies that significantly improve or revise the way work is performed* • *Suggests or proposes alternative ways to view or define problems; is not constrained by conventional thinking and established approaches* • *Combines ideas in unique ways or makes connections between disparate ideas*

Customer Service	**Works with clients and customers (that is, any individuals who use or receive the services or products that your work unit produces, including the general public, individuals who work in the agency, other agencies, or organizations outside the Government) to assess their needs, provide information or assistance, resolve their problems, or satisfy their expectations; knows about available products and services; is committed to providing quality products and services.** • *Commits to serving the public and understands their advisory role* • *Utilizes outreach, needs assessment, evaluation, and other marketing skills to identify and anticipate customer needs and provide exemplary customer service* • *Understands diverse customer groups, their perspectives, issues and needs* • *Works to ensure customers' needs are met, even when those needs are outside of the typical role of the position* • *Identifies and develops metrics to assess customer service satisfaction* • *Continuously improves products and services* • *Works and plans strategically, using a systems perspective to anticipate developing customer issues and needs and to provide timely solutions that focus on long-term benefits*
Entrepreneurship	**Positions the organization for future success by identifying new opportunities; builds the organization by developing or improving products or services. Takes calculated risks to accomplish organizational objectives.** • *Is aware of organizational and programmatic goals and seeks avenues to enhance goal achievement.* • *Considers overall structures, patterns, and cycles in the organization/systems, and uses assessment, analysis, and evaluation methodologies to define metrics and standards of performance.* • *Streamlines operations for maximum efficiency, automation, and effectiveness where appropriate.* • *Incorporates an awareness of current and future management directives, required functional and technical expertise, resource requirements, and targeted stakeholders into work plans.*
Flexibility	**Is open to change and new information; adapts behavior or work methods in response to new information, changing conditions, or unexpected obstacles; effectively deals with ambiguity.** • *Effectively adjusts strategies or course of action in response to changing conditions* • *Makes quality decisions when faced with ambiguous situations* • *Is willing to incorporate new information into decision making process* • *Adapts behavior to overcome challenges*
Influencing/Negotiating	**Persuades others to accept recommendations, cooperate, or change their behavior; works with others towards an agreement; negotiates to find mutually acceptable solutions.** • *Persuades and influences parties to cooperate and accept recommendations* • *Explains and clarifies perspectives of an issue and its impact on all parties* • *Negotiates to achieve consensus through changed opinion, attitude or behavior* • *Demonstrates logic, communicates and persuades others to see benefits of recommendations within and across groups* • *Understands all sides of an issue and its impact on all parties involved* • *Negotiates with individuals or groups, including those that are resistant, to consider cooperating in order to achieve an acceptable solution*

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Integrity/Honesty	**Contributes to maintaining the integrity of the organization; displays high standards of ethical conduct and understands the impact of violating these standards on an organization, self, and others; is trustworthy.** • *Takes pride in exhibiting personal and organizational integrity and honesty* • *Acts in a just, fair, and ethical manner and encourages ethical behavior among others, even when risky to do so* • *Inspires trust and confidence among stakeholders through reliability, authenticity, and accountability*
Interpersonal Skills	**Treats others with courtesy, sensitivity, and respect. Considers and responds appropriately to the needs and feelings of different people in different situations.** • *Shows respect for the values and ideas of others, even when not agreeing with them* • *Empathizes with the concerns of others* • *Demonstrates tact and courtesy when interacting with associates* • *Is proactive in defusing arguments among peers* • *Seeks feedback from others to avoid blind-spots that can cause misunderstandings* • *Explores issues with the team; shares information; solicits ideas' uses participative decision-making processes*
Oral Communication	**Expresses information (for example, ideas or facts) to individuals or groups effectively, taking into account the audience and nature of the information (for example, technical, sensitive, controversial); makes clear and convincing oral presentations; listens to others, attends to nonverbal cues, and responds appropriately.** • *Speaks honestly, effectively and with integrity* • *Makes convincing, articulate, and accurate oral presentations using non-verbal and vocal qualities that support the verbal spoken message* • *Effectively uses various communication channels, including meetings, presentations and briefings* • *Actively considers, plans for, and reacts appropriately to the audience and the contextual environment in order to minimize barriers to understanding* • *Explains complex information clearly and accurately, and seeks feedback to determine that understanding has occurred* • *Acts as an effective facilitator in group or team settings*
Organizational Awareness	**Knows the organization's mission and functions, and how its social, political, and technological systems work and operates effectively within them; this includes the programs, policies, procedures, rules, and regulations of the organization.** • *Demonstrates awareness of the mission, functions, and various levels of the organization* • *Understands how decisions or actions of one organizational component may affect other components* • *Leverages knowledge of organizational components, programs, and directions to improve products, actions, or decisions* • *Shows familiarity with the rules and regulations of the organization*

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Partnering	**Develops networks and builds alliances; collaborates across boundaries to build strategic relationships and achieve common goals.** • *Demonstrates an understanding of interrelationships, roles, and responsibilities within the organization* • *Develops and maintains professional relationships* • *Is aware of organizational and programmatic goals and seeks avenues to mutually enhance goal achievement* • *Identifies opportunities for collaboration across organization units*
Problem Solving	**Identifies problems; determines accuracy and relevance of information; uses sound judgment to generate and evaluate alternatives, and to make recommendations.** • *Examines problems and solutions with a long-term perspective* • *Effectively leads others in the effort of developing, identifying, and formulating problem solving strategies consistent with organizational goals* • *Uses logic to develop and implement innovative tools and techniques to resolve complex problems and issues* • *Uses logic to resolve complex, unique, or unusual problems* • *Consistently anticipates challenges that are not obvious to others* • *Determines the relevance of information in reaching effective conclusions* • *Formulates recommendations for the best course of action to address problems*
Project Management	**Knowledge of the principles, methods, or tools for developing, scheduling, coordinating, and managing projects and resources, including monitoring and inspecting costs, work, and contractor performance.** • *Schedules and keeps track of major project milestones and persons responsible* • *Communicates with various stakeholders to ensure that projects stay on time and on budget* • *Identifies and plans for external and internal barriers to project delivery* • *Delegates work to team members as necessary and ensures completion of work*
Reasoning	**Identifies rules, principles, or relationships that explain facts, data, or other information; analyzes information and makes correct inferences or draws accurate conclusions.** • *Determines the relevance of information in reaching effective conclusions* • *Uses logic to determine relationships among information in order to reach conclusions* • *Makes appropriate inferences from data, rules, or other information*
Teamwork	**Encourages and facilitates cooperation, pride, trust, and group identity; fosters commitment and team spirit; works with others to achieve goals.** • *Volunteers to assist associates with projects* • *Commits to working toward team or group goals* • *Displays team pride and empowers team pride among other group members* • *Works effectively in group settings in order to achieve team objectives*

Writing	**Recognizes or uses correct English grammar, punctuation, and spelling; communicates information (for example, facts, ideas, or messages) in a succinct and organized manner; produces written information, which may include technical material that is appropriate for the intended audience.** • *Composes clear, concise, and logical documents or correspondence involving complex technical information* • *Consistently and effectively tailors written products to a wide range of audiences and for diverse purposes in order to achieve a desired outcome* • *Proofreads and edits the writing of others* • *Effectively explains complex technical material to a non-technical audience* • *Uses correct grammar, punctuation, and spelling* • *Writes in an organized fashion that is easy to understand*

Table 4: General Competencies by Assessment Tool

Competency	Structured Resume Review	Structured Interview	Biodata	Cognitive Ability Test
Accountability	Low	High	High	Low
Attention to Detail	Medium	Medium	Low	High
Compliance	Medium	High	Low	Low
Creative Thinking	Low	High	Medium	Medium
Customer Service	Low	High	Low	Low
Entrepreneurship	High	High	Medium	Medium
Flexibility	Low	High	Medium	Low
Influencing/ Negotiating	Medium	High	Low	Low
Integrity/Honesty	Low	High	Medium	Low
Interpersonal Skills	Low	High	Low	Low
Oral Communication	Medium	High	Medium	Low

Competency	Job Knowledge Test	Personality Inventory	Situational Judgment Test	Work Sample
Accountability	Low	High	High	Low
Attention to Detail	Low	Medium	Low	High
Compliance	Low	High	Low	Low
Creative Thinking	Low	Medium	Low	High
Customer Service	Low	High	Low	Low
Entrepreneurship	Low	High	Medium	Medium
Flexibility	Low	High	Medium	High
Influencing/ Negotiating	Low	Medium	Medium	Medium
Integrity/Honesty	Low	High	Medium	Low
Interpersonal Skills	Low	High	Low	Low
Oral Communication	Medium	Medium	Medium	Medium

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Competency	Occupational Questionnaire	Structured Interview	Biodata	Cognitive Ability Test
Organizational Awareness	Low	High	Low	Low
Partnering	Low	High	Medium	Low
Problem Solving	Low	High	Medium	High
Project Management	Medium	High	Medium	Low
Reasoning	Low	Low	Low	High
Teamwork	Low	High	Medium	Low
Technical Competence	High	High	Low	Low
Writing	Low	Low	Medium	Low

Competency	Job Knowledge Test	Personality Inventory	Situational Judgment Test	Work Sample
Organizational Awareness	Medium	Low	Low	Low
Partnering	Low	Medium	High	Medium
Problem Solving	Low	Low	Medium	High
Project Management	Low	Low	High	High
Reasoning	Low	Low	High	Medium
Teamwork	Low	Medium	Medium	Medium
Technical Competence	High	Low	Medium	High
Writing	Low	Low	Low	High

Table 5: Technical Competencies for Assessment & Selection by Series

The following technical competencies are valid for assessment and selection, performance management, and other related human capital functions for the occupational series listed below. (NOTE: While the technical competencies below have been validated for assessment and selection for the series listed below, they are not REQUIRED to be used for assessment and selection for those series. Further, other technical competencies not listed below may be required depending on the position. Rely on the results of a job analysis and feedback from the hiring manager and subject matter experts to determine the exact technical competencies needed for a particular hire).

Table 5A: Technical Competencies for Assessment & Selection by Grade
GS-0401 – Natural Resources Management and Biological Sciences

- Aquatic Ecology
- Biology
- Botany
- Conservation Biology
- Data Interpretation
- Data Management
- Ecology
- Field Data Collection
- Geospatial Information Systems
- Landscape Ecology
- Plant Ecology
- Restoration Ecology
- Wildlife and Fisheries Biology Management Techniques
- Wildlife Biology

Table 5B: Technical Competencies for Assessment & Selection by Grade
GS-0408 - Ecology

- Aquatic Ecology
- Biology
- Conservation Biology
- Data Interpretation
- Data Management
- Ecology
- Field Data Collection
- Landscape Ecology
- Plant Ecology
- Research and Statistics

Table 5C: Technical Competencies for Assessment & Selection by Grade
GS-0430 – Botany

- Biology
- Biosystematics
- Botany
- Conservation Biology
- Data Interpretation
- Data Management
- Ecology
- Field Data Collection
- Genetics
- Landscape Ecology
- Plant Ecology
- Research and Statistics
- Restoration Ecology
- Soil Ecology

Table 5D: Technical Competencies for Assessment & Selection by Grade
GS-0454 – Rangeland Management

- Agronomy
- Animal Husbandry
- Biology
- Conservation Biology
- Data Interpretation
- Earth Science
- Ecology
- Field Data Collection
- Fire Management
- Geospatial Information Systems
- Landscape Ecology
- Plant Ecology
- Public Planning
- Rangeland Management
- Restoration Ecology
- Soil Ecology

Table 5E: Technical Competencies for Assessment & Selection by Grade
GS-0460 – Forestry

- Biology
- Botany
- Conservation Biology
- Data Interpretation
- Dendrology
- Ecology
- Entomology
- Field Data Collection
- Fire Management
- Forest Management
- Geospatial Information Systems
- Hydrology
- Information Management
- Landscape Ecology
- Plant Ecology
- Remote Sensing
- Restoration Ecology
- Soil Ecology
- Timber Management Accounting and Economics

Table 5F: Technical Competencies for Assessment & Selection by Grade
GS-0480 – Fish and Wildlife Administration

- Aquatic Ecology
- Biology
- Conservation Biology
- Data Interpretation
- Ecology
- Landscape Ecology
- Wildlife and Fisheries Biology Management Techniques
- Wildlife Biology

Table 5G: Technical Competencies for Assessment & Selection by Grade
GS-0482 – Fish Biology

- Aquatic Ecology
- Biology
- Conservation Biology
- Data Interpretation
- Data Management
- Ecology
- Field Data Collection
- Fishery Biology
- Hydrology
- Research and Statistics
- Wildlife and Fisheries Biology Management Techniques

Table 5H: Technical Competencies for Assessment & Selection by Grade
GS-0485 – Wildlife Refuge Management

- Aquatic Ecology
- Biology
- Botany
- Conservation Biology
- Data Interpretation
- Ecology
- Field Data Collection
- Fire Management
- Hydrology
- Landscape Ecology
- Mammalogy
- Ornithology
- Plant Ecology
- Public Planning
- Restoration Ecology
- Wetland Biology and Ecology
- Wildlife and Fisheries Biology Management Techniques
- Wildlife Biology

Table 5I: Technical Competencies for Assessment & Selection by Grade
GS-0486 – Wildlife Biology

- Biology
- Botany
- Conservation Biology
- Data Interpretation
- Data Management
- Ecology
- Field Data Collection
- Geospatial Information Systems
- Landscape Ecology
- Mammalogy
- Ornithology
- Research and Statistics
- Wildlife and Fisheries Biology Management Techniques
- Wildlife Biology

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Appendix A: Biological Science General Competencies

Accountability	Holds self and others accountable for measurable high-quality, timely, and cost-effective results. Determines objectives, sets priorities, and delegates work. Accepts responsibility for mistakes. Complies with established control systems and rules.
Attention to Detail	Is thorough when performing work and conscientious about attention to detail.
Compliance	Knowledge of procedures for assessing, evaluating, and monitoring programs or projects for compliance with Federal laws, regulations, and guidance.
Creative Thinking	Uses imagination to develop new insights into situations and applies innovative solutions to problems; designs new methods where established methods and procedures are inapplicable or are unavailable.
Customer Service	Works with clients and customers (that is, any individuals who use or receive the services or products that your work unit produces, including the general public, individuals who work in the agency, other agencies, or organizations outside the Government) to assess their needs, provide information or assistance, resolve their problems, or satisfy their expectations; knows about available products and services; is committed to providing quality products and services.
Entrepreneurship	Positions the organization for future success by identifying new opportunities; builds the organization by developing or improving products or services. Takes calculated risks to accomplish organizational objectives.
Flexibility	Is open to change and new information; adapts behavior or work methods in response to new information, changing conditions, or unexpected obstacles; effectively deals with ambiguity.
Influencing/Negotiating	Persuades others to accept recommendations, cooperate, or change their behavior; works with others towards an agreement; negotiates to find mutually acceptable solutions.
Integrity/Honesty	Contributes to maintaining the integrity of the organization; displays high standards of ethical conduct and understands the impact of violating these standards on an organization, self, and others; is trustworthy.

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Interpersonal Skills	Treats others with courtesy, sensitivity, and respect. Considers and responds appropriately to the needs and feelings of different people in different situations.
Oral Communication	Expresses information (for example, ideas or facts) to individuals or groups effectively, taking into account the audience and nature of the information (for example, technical, sensitive, controversial); makes clear and convincing oral presentations; listens to others, attends to nonverbal cues, and responds appropriately.
Organizational Awareness	Knows the organization's mission and functions, and how its social, political, and technological systems work and operates effectively within them; this includes the programs, policies, procedures, rules, and regulations of the organization.
Partnering	Develops networks and builds alliances; collaborates across boundaries to build strategic relationships and achieve common goals.
Problem Solving	Identifies problems; determines accuracy and relevance of information; uses sound judgment to generate and evaluate alternatives, and to make recommendations.
Project Management	Knowledge of the principles, methods, or tools for developing, scheduling, coordinating, and managing projects and resources, including monitoring and inspecting costs, work, and contractor performance.
Reasoning	Identifies rules, principles, or relationships that explain facts, data, or other information; analyzes information and makes correct inferences or draws accurate conclusions.
Teamwork	Encourages and facilitates cooperation, pride, trust, and group identity; fosters commitment and team spirit; works with others to achieve goals.
Technical Competence	Uses knowledge that is acquired through formal training or extensive on-the-job experience to perform one's job; works with, understands, and evaluates technical information related to the job; advises others on technical issues.
Writing	Recognizes or uses correct English grammar, punctuation, and spelling; communicates information (for example, facts, ideas, or messages) in a succinct and organized manner; produces written information, which may include technical

	material that is appropriate for the intended audience.

Biological Science Technical Competencies[3]

Agronomy	Knowledge of the concepts, principles, practices, and theories of soil management and crop production.
Animal Husbandry	Knowledge of the care and handling of animals, including feeding, capture, controlling, restraint, health, and reproduction.
Aquatic Ecology	Knowledge of the concepts, principles, practices, and theories of how aquatic species interact with each other and their environment in aquatic habitats, including streams, rivers, lakes, wetlands, and coastal areas.
Biology	Knowledge of the environment, plant and animal living tissue, cells, organisms, and entities, including their functions, interdependencies and interactions with each other and the environment.
Biosystematics	Knowledge of the concepts, principles, practices, and theories of the statistical analysis of data obtained from genetic, biochemical, and other studies to assess the taxonomic relationships of organisms or populations, especially within an evolutionary framework.
Botany	Knowledge of the concepts, principles, and theories of plants, including structures and functions, classification, taxonomy, plant communities, distribution, habitat requirements, life histories, reproduction, conservation, and care of plant species.
Chemistry	Knowledge of the concepts, principles, and theories of the composition, structure, and properties of substances, and of the chemical processes and transformations, including uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.

[3] Includes competencies identified for positions by SMEs that were not considered "critical" across each occupational series. These competencies may still be used for training and development purposes.

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Conservation Biology	Knowledge of the concepts, principles, practices, and theories of the management of natural systems and biodiversity with the aim of protecting species, habitats, ecosystems, and ecological functions.
Data Interpretation	Skill in collecting, analyzing, and interpreting data to determine actions and develop or propose guidance.
Data Management	Knowledge of the principles, procedures, and tools of data management, such as modeling techniques, data backup, data recovery, data dictionaries, data warehousing, data mining, data archiving, data disposal, and data standardization processes.
Dendrology	Knowledge of the concepts, principles, and characteristics of trees, shrubs, and other woody plants.
Earth Science	Knowledge of interdisciplinary disciplines associated with the earth's composition, structure, or other physical aspects, including atmosphere and oceans.
Ecoinformatics	Knowledge of the concepts, principles, practices, and theories of the integration of environmental and informational sciences to facilitate environmental research and management through innovations in accessing information, database integration, and algorithm development to enable dataset combination.
Ecology	Knowledge of the concepts, principles, and theories of the interrelationships among organisms and their environment, including competition and predation, evolution and natural selection, population dynamics, and the impact of natural phenomena or human actions on natural systems, processes, and biota.
Entomology	Knowledge of the concepts, principles, and theories of insects, including taxonomy, morphology, behavior, life cycles, population dynamics, host-insect interactions, the role of insects in natural and managed ecosystems, and the

	regulation, prevention, and control of pest-related problems.
Field Data Collection	Ability to collect, record, and ensure accuracy of field data (for example, stream and river discharge measurements).
Fire Management	Knowledge of the concepts, principles, and theories of fire management, including the characteristics, behavior, and ecology of fire; methodologies, strategies, and equipment used in prescribed fires; fire detection, prevention, and suppression strategies; and integration of fire with natural resource management.
Fishery Biology	Knowledge of the concepts, principles, and theories of fish, including classification, taxonomy, population dynamics, distribution, habitat requirements, life histories, reproduction, behaviors, conservation, and care of aquatic species.
Forest Management	Knowledge of the concepts, principles, and theories of silviculture and forest ecology, forest use, management, harvesting, conducting inventories, regeneration, sustainability, and conservation; and the role of disturbances in timberland resources.
Genetics	Knowledge of the concepts, principles, and theories of genetics, including the biochemistry of DNA, gene interaction, gene expression, gene inheritance, population genetics, adaptation, and evolution.
Geographical Sciences	Knowledge of the concepts, principles, theories, and methods for describing the location and distribution of land, sea, and air masses, including their physical locations, relationships, characteristics, and what the land supports.
Geospatial Information Systems	Knowledge of and skill in manipulating computer systems designed for capturing, storing, analyzing, and displaying data related to positions on the surface of the earth and other planetary bodies in order to

	better understand spatial patterns and relationships.
Herpetology	Knowledge of reptiles and amphibians including classification, identification, distributions, biology, ecology, communities, and management.
Horticulture	Knowledge of the concepts, principles, practices, and theories of the cultivation of plants.
Hydrology	Knowledge of the concepts, principles, theories, and methods related to the magnitude, distribution, and quality of water resources including watershed management, climatology, geomorphology, groundwater hydrology, water quality, water resource management, and groundwater/surface water interactions.
Information Management	Identifies a need for and knows where or how to gather information; organizes and maintains information or information management systems.
Landscape Ecology	Knowledge of the concepts, principles, practices, and theories of the influence exerted by spatial and temporal patterns on the organization of, and interaction among, functionally integrated multispecies ecosystems.
Life Sciences and Systems	Knowledge of life sciences that involve the theoretical and experimental research of life systems.
Mammalogy	Knowledge of mammals including classification, identification, distributions, biology, ecology, communities, and management.
Modeling and Simulation	Knowledge of the tools and techniques used to develop functional, physical, or prototype models and simulations for test and evaluation programs, the prediction of behavior and phenomena, and to visually communicate concepts.

Ornithology	Knowledge of birds including classification, identification, distributions, biology, ecology, communities, and management.
Pathology	Knowledge of the concepts, principles, and theories of plant, insect, or animal diseases and host/pathogen relationships, including effects on natural and managed ecosystems.
Plant Ecology	Knowledge of the concepts, principles, practices, and theories of the distribution and abundance of plants, the effects of environmental factors upon the abundance of plants, and the interactions among and between plants and other organisms.
Public Planning	Knowledge of functions, principles, methods, and techniques of public planning, including those related to community planning, outdoor recreation planning, and natural resource management, such as demand forecasting, environmental impact analysis, financial forecasting, and land use planning and zoning.
Rangeland Management	Knowledge of the concepts, principles, and theories of non-forested or forested land ecosystems, including rangeland use, management, and monitoring; conducting inventories; and the role of disturbances in rangeland ecosystems.
Remote Sensing	Knowledge of the concepts, principles, theories, and methods necessary to obtain, use, and interpret data from remote sensing sources, including ground and aerospace-based sensors.
Research and Statistics	Knowledge of scientific principles, methods, and tools of basic and applied research (for example, statistics and data analysis) used to conduct a systematic inquiry into a subject matter area.
Restoration Ecology	Knowledge of the concepts, principles, practices, and theories of renewing, restoring, and enhancing degraded, damaged, or destroyed ecosystems and habitats.

Soil Ecology	Knowledge of the concepts, principles, practices, and theories of the interactions among soil organisms and between biotic and abiotic aspects of the soil environment.
Timber Management Accounting and Economics	Knowledge of timber management accounting practices to reconcile load booklets, scale tickets, and physical surveillance against submitted payments to ensure accuracy of payments for natural resource commodities. Knowledge and understanding of market conditions sufficient to merchandise timber products to obtain the best value for government natural resource commodities while achieving resource objectives.
Wetland Biology and Ecology	Knowledge of the concepts, principles, and theories of wetland biology and management, including classification schemes, types, community composition, distribution, ecological functions and disturbances, conservation, and management.
Wildlife and Fisheries Biology Management Techniques	Knowledge of the concepts, principles, and theories of techniques employed in wildlife and fisheries biology and management, including capture techniques, marking, transport, harvest, sampling, aging and sexing, species identification, monitoring, captive-rearing and other techniques.
Wildlife Biology	Knowledge of the concepts, principles, and theories of wildlife biology and management, including classification, taxonomy, population dynamics, distribution, habitat requirements, life histories, reproduction, behaviors, conservation, and care of wildlife.

Appendix B

Biological Science Study Tasks and Duties

Duty 1 – Compiles, organizes, or conveys information.
Associated Tasks:
Collects, compiles, and organizes information.
Monitors, maintains, or updates data, records, or other information.
Conducts evaluations, examinations, literature reviews, or other studies to obtain or verify information.
Creates tables, charts, graphs, maps, or diagrams to organize or show information.
Develops and maintains computer databases.

Duty 2 – Communicates with others.
Associated Tasks:
Drafts correspondence or other written work (for example, manuals, technical reports, research or contract proposals).
Discusses results, problems, plans, suggestions, terms, or conditions with others.
Explains or justifies decisions, conclusions, findings, or recommendations.
Reviews and provides feedback on the content of information.
Explains technical or other complex information to a nontechnical audience.

Duty 3 – Makes decisions or resolves problems.
Associated Tasks:
Recommends or makes improvements or solutions to problems, or determines appropriate actions.
Resolves land use conflicts between proposed land uses and other resource mandates.
Establishes new and modified methods, techniques, and procedures to resolve technical problems.

Duty 4 – Provides oversight, input, or interpretation of laws, rules, regulations, or policies.
Associated Tasks:
Evaluates the impact of changes to laws, regulations, policies, standards, case law, or procedures.
Writes regulations, policies, standards, or procedures.
Interprets, evaluates, or ensures compliance with laws, regulations, policies, standards, permits, or procedures.
Prepares or reviews Environmental Impact Statements.
Determines restrictions or limitations and issues permits for activities (e.g., grazing, planting, research, or commercial filming).

Duty 5 – Manages programs or projects.

Associated Tasks:

Develops, modifies, or provides input on plans, goals, or objectives for projects, programs, systems, or operations.

Coordinates immediate and long-range objectives and plans.

Develops scientific proposals or programs and associated funding to further Department and Bureau missions and objectives.

Determines resources requirements (for example, staffing, equipment) based on program or project objectives or operational needs.

Advises leadership on scientific and resource issues.

Designs, coordinates, and monitors research and biological monitoring or inventorying programs and activities.

Develops long-range plans, annual work plans, budgets, and work schedules.

Develops, reviews, recommends, and implements changes to mitigation program policies, standards, methods, controls, and procedures.

Reviews projects or activities proposed by other agencies, partners, or external stakeholders to identify conflicts and make recommendations on approval.

Conducts program analyses and reviews results of studies or investigations.

Develops cost estimates and work sequencing for construction, maintenance, or rehabilitation projects.

Evaluates the impact of the latest technological advances in natural resource management on studies and programs.

Duty 6 – Directs the work of others.

Associated Tasks:

Ensures adherence to conduct and safety protocols of employees during the performance of duties.

Trains staff or volunteers.

Schedules work assignments, sets priorities, and coordinates the work of staff.

Duty 7 – Conducts analysis or research.

Associated Tasks:

Designs or conducts analytical studies, resource monitoring, or other research.

Analyzes or interprets data or other information.

Reads and records data obtained from technical or scientific instruments, or indicators.

Prepares peer-reviewed written scientific publications and presentations.

Performs peer review for outside publications or conferences.

Analyzes spatial data.

Analyzes data sets to reveal patterns, trends, and associations.

Writes reports on study findings and recommendations.
Review biological portions of environment assessment/impact statements or comprehensive resource planning reports to evaluate environmental consequences of proposed actions on fish, wildlife, or botanical and vegetation resources of concern.
Performs geospatial analyses in determining conservation plans, risk assessments, or other large scale assessments.
Collects and analyzes data.
Prepare samples and perform standard data analyses.
Obtain data from various sources to create digital maps and perform GIS (Geographic Information System) analyses.

Duty 8 – Manages or collaborates with stakeholders.
Associated Tasks:
Participates in meetings with members of the public, industry, or other Federal and state agencies (e.g., conferences).
Establishes, maintains, and cultivates relationships with external stakeholders.
Researches, identifies, and negotiates partnerships, cooperative agreements, interagency agreements, and/or memoranda of understandings with other agencies, institutions, or organizations.
Develops and evaluates national science program strategies and activities in collaboration with other agencies and organizations to address botanical, wildlife science, and management issues.
Coordinates with leadership or external stakeholders to determine best practices, reach agreements, or set strategic direction.
Conduct outreach activities associated with species or vegetation management with local communities and governments, tribal governments, or other federal or state agencies.
Integrates scientific principles from multiple disciplines and serves on multidisciplinary teams.
Coordinates internal and external partnerships in order to reach shared goals or decisions.

Duty 9 – Conducts monitoring or ecological management activities.
Associated Tasks:
Identifies and manages invasive and non-native species.
Designs, implements, and coordinates the monitoring of native, special status, and at risk plant species and communities.

Duty 10 – Conducts investigations, studies, or experiments.
Associated Tasks:
Plan, evaluate, and conduct ecological investigations of complex land and water development proposals to determine their effect on the distribution and abundance of living organisms.

Conduct investigations of the status, life requirements, habitat availability, and improvement and recovery needs for various plants, fish, or wildlife, including listed threatened or endangered species and other species of special concern.
Assist in planning, organizing, and implementing biological investigations.
Conducts field experiments to test hypotheses.
Deploys remote data-collection systems.

Duty 11 – Performs other technical duties.
Associated Tasks:
Keeps abreast of latest technology, information, research, etc., to maintain knowledge in field of expertise.
Provides technical advice in subject matter area to others.
Manages or operates Federally-owned or managed lands and waters.
Oversees the conservation, protection, management, restoration, or enhancement of species and habitats.
Designs restoration or enhancement plans.
Analyzes biological and physical components of ecosystems.
Develop, review, and implement management plans to ensure preservation, protection, restoration, and enhancement of native biodiversity and ecosystems for a geographic area having a variety of habitat conditions.
Conducts fire management activities associated with fuel management, initial attack on wildfires and suppressing wildfires.
Develops and provides recommendations, terms, or conditions to support natural resource extraction.
Provides direction for facilitating activities on Federal lands, such as hunting, fishing, or recreation.
Plans, develops, conducts, and modifies physiological and biochemical tests to determine the effects of fishery chemicals on aquatic organisms.
Oversees the maintenance or construction of buildings, equipment, roads, fences, or other structures or property.
Investigates and initiates reports of unauthorized use, damages, or trespass.
Evaluates and appraises value of resources (e.g., cruise and appraisal of timber).
Marks timber for sale and makes timber cruises to estimate the volume of trees to be sold.
Evaluates sale program activities for compliance with established policies, standards, procedures, and program objectives.
Conducts forest pest surveys and carries out control measures.
Manages nurseries or greenhouses.
Coordinates inspections of proposed surface disturbing activities associated with oil and gas development or other land uses.

Conducts field inspections of oil and gas operations or other surface use authorizations to determine compliance with applicable laws, regulations, or lease terms.

Biological Science Competency Model