BUDGET JUSTIFICATIONS

The United States Department of the Interior

and Performance Information Fiscal Year 2025

U.S. GEOLOGICAL SURVEY

NOTICE: These budget justifications are prepared for the Interior, Environment and Related Agencies Appropriations Subcommittees. Approval for release of the justifications prior to their printing in the public record of the Subcommittee hearings may be obtained through the Office of Budget of the Department of the Interior.

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Executive Summary

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Executive Summary

The U.S. Geological Survey (USGS) is the Nation's largest water, earth, and biological science and civilian mapping agency. As the science arm of the Department of the Interior, the USGS is the primary Federal source of science-based, publicly accessible information on ecosystems, land resources, energy and mineral resources, natural hazards, water use and availability, and authoritative mapping and images of the Earth's land features.

The USGS brings a diverse set of expertise and capabilities to carry out large-scale, multidisciplinary investigations in partnership with other Interior bureaus, Federal agencies, Tribes, States, local jurisdictions, and others to deliver impartial, actionable science that is used every day by resource managers and planners, emergency response officials, and the public on societally important issues.

The 2025 budget request is $1.6 billion, an overall increase of +$81.1 million from the 2024 annualized continuing resolution (CR) level. The budget request proposes investments to advance scientifically sound and useful tools and information to support effective and efficient decision-making on our Nation's lands, waters, and biological resources. The 2025 budget request includes a $12.0 million increase that is critical for the development of the Landsat Next satellite mission, which would ensure continuity of the longest space-based record of Earth's land surface, while also revolutionizing the breadth and depth of actionable information freely available to end users. The proposed increase for Landsat Next would support the satellite's development in partnership with NASA. The Landsat Next constellation of three satellites would replace the Landsat 8 satellite, which is nearing the end of its operational life. Landsat Next will have the capabilities to unlock new applications for water quality, crop production and plant stress, climate and snow dynamics, soil health and other variables essential to farmers, land managers, and others whose decisions depend on this information for effective management of agriculture, wildfire mitigation, drought, and many other resource issues.

The 2025 budget request also invests in scientific quality and integrity capabilities, ensuring that USGS science remains the gold standard for unbiased, evidence-based decision making. With this objective, the USGS proposes a $1.7 million increase for an integrated laboratory support, training, and oversight program to strengthen safety, bio-risk management, quality, integrity, and animal welfare best practices in USGS laboratories.

Drought continues to be a significant challenge, affecting the Nation both economically and societally, and resulting in fundamental changes to our Nation's landscape. Prolonged droughts, particularly in the West, are causing fundamental shifts in our Nation's lands and waters. Stakeholders, including the agriculture industry and Federal, State, and local governments and Tribes, have an immediate need for drought information, data, and tools that USGS is well positioned to provide. The 2025 budget request makes targeted investments in drought science, bringing USGS' scientific capabilities to bear on solving this critical problem. The USGS proposes an additional $7.0 million investment in actionable science tools for drought response, which will ensure delivery of tools and information useful to land managers for drought planning in the near-term. In the long term, this investment would provide science and

monitoring to inform longer-term management, planning, and decision-making efforts, particularly for potential transformational shifts in ecosystems.

Within the FY 2025 budget, USGS also proposes to expand the Federal Priority Streamgage (FPS) Network and advance national and regional Integrated Water Availability Assessments (IWAAs) and the 3D Hydrography Program (3DHP), which would provide decisionmakers water data and assessments as they manage and plan for drought, among other uses. Continuing investments in these activities will further our understanding of factors contributing to drought and will help build a robust predictive capability for drought resilience planning at local, regional, and national levels.

Further, the 2025 budget proposes to invest in additional science and analysis that is needed to support national security and natural resource management decisions. The 2025 budget request furthers our understanding of these resources and how they are impacted by a variety of variables such as wildfire, and mineral resources supply chain disruptions, informing land and water stewardship decisions. Through the Energy and Mineral Resources Mission Area, the USGS would expand critical mineral supply chain forecasting and scenario analysis efforts, which inform billions of dollars in Federal and private sector investments and include risk analysis methodologies for supply chain disruptions ranging from trade wars to natural disasters to electric vehicle market penetration. In the Ecosystems Mission Area, the USGS would make additional investments in wildlife migration corridor research, especially for big game populations, to meet the science needs of the Department of the Interior's Conservation Strategy and support numerous Federal agencies, Tribes, and western States. The 2025 budget would allow the USGS to provide a full inventory of existing migrations and science-delivery architecture to make migration maps viewable, publicly available, and actionable for conservation. Furthermore, through investments in the American Conservation and Stewardship Atlas and Conservation.gov, the USGS would bring information about conservation, restoration, and stewardship of America's land and waters into an easily-accessible map-based tool for decision makers. These efforts together would advance USGS science to inform evidence-based decision-making on a variety of topics of national importance that affect the public every day.

2025 President's Budget ($000)

Budget Authority	2023 Actual	2024 Annualized CR	2025 President's Budget	Change from 2024 CR
Current	1,497,178	1,497,178	1,578,298	+81,120
Permanent	715	575	575	+0
Total Current, w/o Supplemental	**1,497,893**	**1,497,753**	**1,578,873**	**+81,120**
2022 Bipartisan Infrastructure Law (BIL) P.L. 117-58	*69,000*	*69,000*	*69,000*	*+0*
OIG Oversight for P.L. 117-58	*-345*	*-345*	*-345*	*+0*
2023 Emergency Supplemental P.L. 117-328	*41,040*	*0*	*0*	*+0*
Total Current w/ Supplemental [1]	**1,607,588**	**1,566,408**	**1,647,528**	**+81,120**
Direct FTEs	4,640	4,640	4,709	+69

[1] Supplemental funding reflects amounts made available in the fiscal year, not estimated allocations or obligations.

Mission Area/Subactivity/Programs (Dollars in Thousands)	2023 Actual	2024 Annualized CR	2025		
			Fixed Costs	Program Changes	President's Budget
Ecosystems	307,176	307,176	+5,228	+13,721	326,125
Energy and Mineral Resources	104,220	104,220	+2,241	+13,872	120,333
Natural Hazards	200,256	200,256	+3,561	+6,824	210,641
Water Resources	304,434	304,434	+4,857	+263	309,554
Core Science Systems	284,607	284,607	+2,947	+25,462	313,016
Science Support	106,304	106,304	+2,597	+9,330	118,231
Facilities	188,051	188,051	-12,632	+4,979	180,398
Special Initiatives	2,130	2,130	+0	-2,130	0
Total	**1,497,178**	**1,497,178**	**+8,799**	**+72,321**	**1,578,298**
Supplementals (less OIG transfer)	109,695	68,655	+0	+0	68,655
Grand Total	**1,606,873**	**1,565,833**	**+8,799**	**+72,321**	**1,646,953**

Zero Emissions Vehicles (ZEVs) – The request for USGS includes $1,214,000 in the Administration and Management Program to support vehicle fleet lifecycle replacement, fleet requirements analysis, charging infrastructure planning and deployment, and fleet capabilities assessments. Across Interior, the 2025 request includes $13 million for this purpose. This funding will continue Interior's efforts to right-size its fleet and replace vehicles with more efficient, mission capable, zero emissions vehicles (ZEV) at the right locations and with the right vehicle mix to deliver Interior's missions. The USGS's fleet planning efforts will continue to ensure ZEVs are integrated into the overall fleet plan, prioritizing locations and appropriate missions for deployment of these vehicles. Additionally, this funding will assist the USGS with adapting electric vehicle support equipment planning and deployment to address installation requirements which vary by geographic region. Finally, this funding provides the USGS with the necessary support to coordinate fleet lifecycle replacement with infrastructure deployment.

Significant Evaluations

The Foundations for Evidence-Policy Act of 2019 requires Agencies to submit a proposal for a significant evaluation within the FY 2025 Budget. USGS has built a significant evaluation into the budget proposal to strengthen USGS laboratory quality, integrity, safety, and strategic investments. This evaluation could cost up to $1 million. A newly formed Federal Advisory Committee on USGS Science Quality and Integrity will conduct the evaluation looking at the advances made toward improved internal controls and quality management within USGS labs. USGS has over 1,600 personnel working in nearly 500 laboratories in 175 unique locations nationwide spanning all science Mission Areas, which include Core Science Systems, Ecosystems, Energy and Mineral Resources, Natural Hazards, and Water Resources. USGS laboratory science is critical to water resources decision makers, critical mineral mapping, early detection of invasive species, among other concerns of Federal, State, and local partners, collaborators, and stakeholders.

Proposed Budget Restructures

The USGS is proposing two budget restructures in FY 2025. One in the Ecosystems Mission Area to the Climate Adaptation Science Centers and Land Change Science Program and one in the Energy and Mineral Resources Mission Area to the Mineral Resources Program. Details are provided in this section.

Ecosystems Restructure – Climate Adaptation Science Center and Land Change Science Program

The Ecosystems Mission Area (EMA) is proposing to elevate the Land Change Science component that is currently within the Climate Adaptation Science Centers and Land Change Science Program into a stand-alone program. Additionally, to better describe the program, Land Change Science would be renamed Ecosystem Change Research Program.

The new budget and organizational structure would:

- Break the Climate Adaptation Science Center and Land Change Science Program into two programs:
    1. National and Regional Climate Adaptation Science Centers
    2. Ecosystem Change Research Program.
- The program breakouts are in-line with current callouts in the Committee Support Table found within appropriations report language.

Rationale

Prior to a reorganization in FY 2020, the Land Change Science Program and National and Regional Climate Adaptation Science Centers (NRCASCs) were independent programs in the Climate and Land Use Mission Area. When the programs were moved to the EMA under a previous restructure, both programs were combined into one budget subactivity. This action has created confusion outside of the USGS about program budgets and how the two programs' science differs. Program and budget clarity is needed to demonstrate how the climate adaptation science conducted by the NRCASCs is different from, but complementary to, the research in the Land Change Science Program. The Land Change Science Program funds interdisciplinary research examining patterns, processes and impacts of environmental change, land use, and climate change in the past, present, and future. The NRCASCs fund shorter-term projects (typically 1-2 years) where climate adaptation research is being applied and tailored to stakeholder needs; the research tends to be applied and end-user driven. The NRCASCs mostly work through regionally-based offices at universities across the Nation to conduct science, while the Land Change Science program supports multidisciplinary scientists across USGS to conduct the science, with a small headquarters staff that implements the program. For Congressional members and stakeholders to be able to distinguish the different roles that both programs play, it is important to recognize the programs as unique and distinct. This change creates one new budget subactivity. However, the programs have already been acting independently with two different program coordinators despite being combined into one budget subactivity; there is no change in staffing or administrative burden. Further, the programs have been called out for years in the Committee Support Table found within appropriations report language; program breakouts in FY 2025 would be in-line with those current callouts. This change simply makes it clearer to Congress and others about the unique aspects of each program.

FTE Considerations

There are no impacts to employees because of this restructuring. There is no change in staffing or administrative burden.

Restructured Funding: FY 2023, FY 2024, and FY 2025

2023 Actual

Former Budget Subactivities Surveys, Investigations and Research $000s	Former Budget Funding	New Ecosystems Subactivities: Environmental Health Program	Species Management Research Program	Land Management Research Program	Biological Threats and Invasive Species Research Program	Cooperative Research Units Program	Ecosystems Change Research Program	National and Regional Climate Adaptation Science Centers
Ecosystems								
Environmental Health Program	30,457	30,457						
Species Management Research Program	63,904		63,904					
Land Management Research Program	54,806			54,806				
Biological Threats and Invasive Species Research Program	46,622				46,622			
Cooperative Research Units Program	28,206					28,206		
Climate Adaptation Science Center and Land Change Science Program	83,181						20,066	63,115

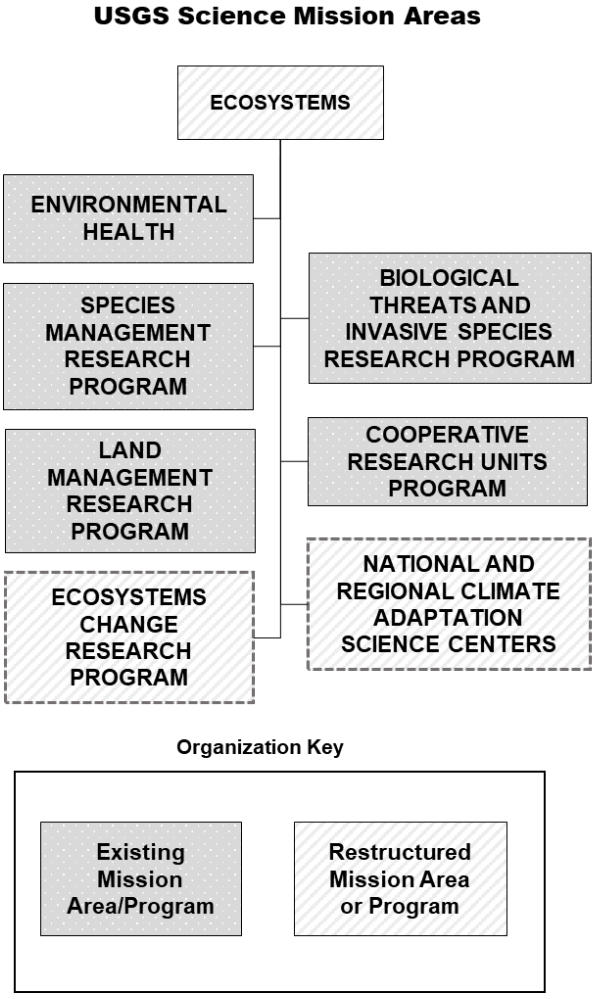
2024 Annualized CR

Former Budget Subactivities Surveys, Investigations and Research $000s	Former Budget Funding	New Ecosystems Subactivities: Environmental Health Program	Species Management Research Program	Land Management Research Program	Biological Threats and Invasive Species Research Program	Cooperative Research Units Program	Ecosystems Change Research Program	National and Regional Climate Adaptation Science Centers
Ecosystems								
Environmental Health Program	30,457	30,457						
Species Management Research Program	63,904		63,904					
Land Management Research Program	54,806			54,806				
Biological Threats and Invasive Species Research Program	46,622				46,622			
Cooperative Research Units Program	28,206					28,206		
Climate Adaptation Science Center and Land Change Science Program	83,181						20,066	63,115

2025 Request

Former Budget Subactivities Surveys, Investigations and Research $000s	Former Budget Funding	New Ecosystems Subactivities: Environmental Health Program	Species Management Research Program	Land Management Research Program	Biological Threats and Invasive Species Research Program	Cooperative Research Units Program	Ecosystems Change Research Program	National and Regional Climate Adaptation Science Centers
Ecosystems								
Environmental Health Program	32,004	32,004						
Species Management Research Program	66,850		66,850					
Land Management Research Program	60,551			60,551				
Biological Threats and Invasive Species Research Program	45,466				45,466			
Cooperative Research Units Program	29,773					29,773		
Climate Adaptation Science Center and Land Change Science Program	91,481						22,181	69,300

Proposed Organization Chart



Energy and Mineral Resources Restructure – Minerals Resources Program

The USGS intends to request that the Chief Statistician of the United States within the Office of Management and Budget designate the National Minerals Information Center as a Recognized Statistical Unit, as described in 44 U.S.C. 3563. To facilitate the designation, the USGS requests that the Unit's budget be identified as a stand-alone sub-account within the Mineral Resources Program budget for increased budgetary transparency. The Unit would no longer report to the North Atlantic-Appalachian USGS Regional Director and would instead report to the Energy and Mineral Resources Associate Director as a national center, recognizing the unit's national breadth and capabilities and to ensure technical leadership and accountability.

The new budget and organizational structure would create two components under the Minerals Resources Program:

1. National Minerals Information Center
2. Mineral Resources Research, Surveys, and Assessments

Rationale

The USGS National Mineral Information Center collects, analyzes, and disseminates information on the domestic and international supply of and demand for minerals and mineral materials essential to the U.S. economy and national security. These data are economically impactful and therefore data users put an extraordinary level of trust in the USGS to provide data quality and consistency. The private-sector has used the data for financial decision-making for many years and is now using the data in new ways. For example, consulting firms are setting up supply chain verification lines of business to establish where minerals in key products are sourced from. These data are also increasingly used in the Federal government and other public sector entities as an important factor in investment decisions.

Designating the National Minerals Information Center as a Recognized Statistical Unit of the Federal government would recognize the USGS commitment to delivering relevant, accurate, and objective mineral statistics and, under the Confidential Information Protection and Statistical Efficiency Act (CIPSEA) of 2018, would ensure confidentiality of information acquired from the private sector and the public. This request to restructure the budget will better position the National Minerals Information Center to receive the designation by improving transparency and the unit's ability to meet the requirements in OMB's 2023 Notice of Proposed Rulemaking.

FTE Considerations

There are no impacts to employees because of this restructuring. There is no change in staffing or administrative burden.

Restructured Funding: FY 2023, FY 2024, and FY 2025

2023 Actual

Former Budget Subactivities Surveys, Investigations and Research $000s	Former Budget Funding	New Energy and Mineral Resources: Energy Resources Program	New Energy and Mineral Resources: Mineral Resources Program	New Energy and Mineral Resources: Component - Mineral Resources Program - Mineral Resources Research, Surveys, and Assessments	New Energy and Mineral Resources: Component - Mineral Resources Program - National Minerals Information Center
Energy and Mineral Resources					
Energy Resources Program	33,365	33,365			
Mineral Resources Program	70,855		70,855	51,794	19,061

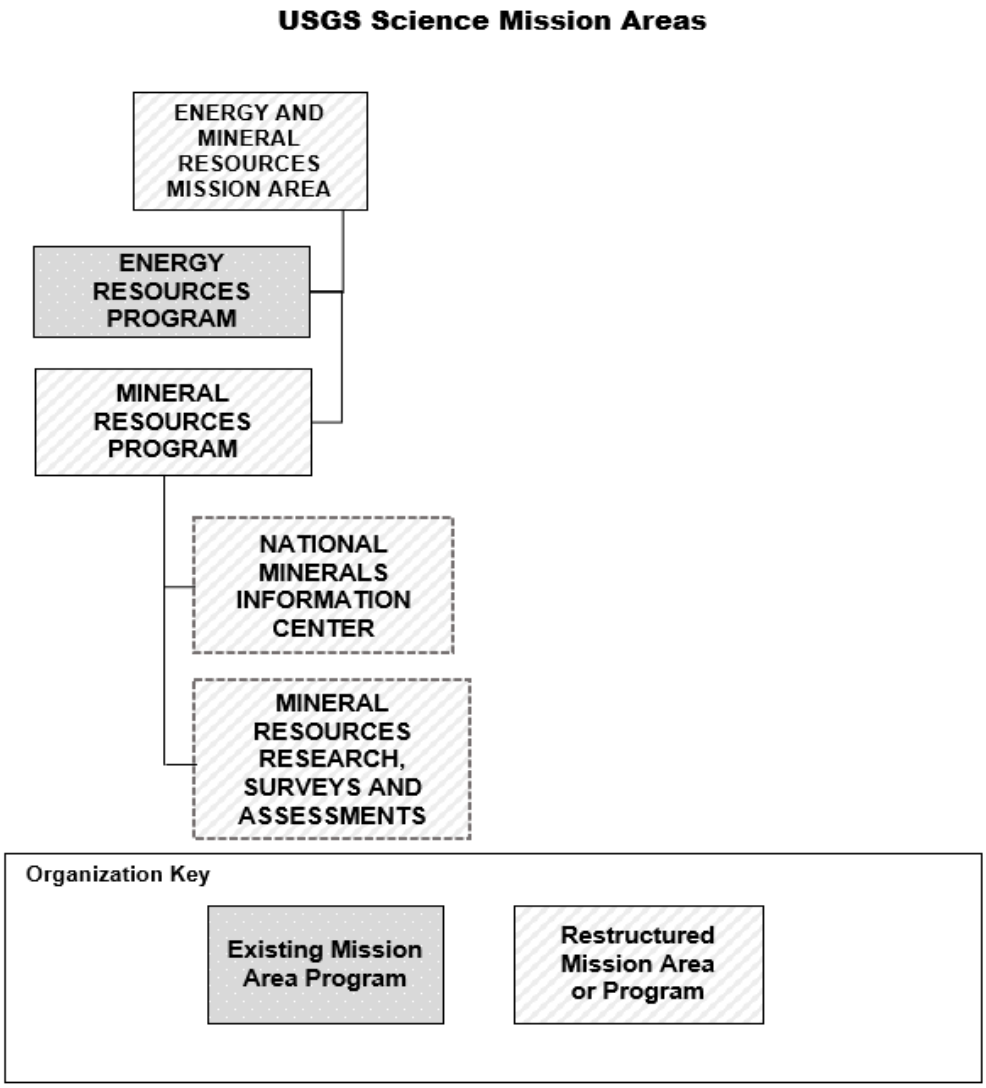
2024 Annualized CR

Former Budget Subactivities Surveys, Investigations and Research $000s	Former Budget Funding	New Energy and Mineral Resources: Energy Resources Program	New Energy and Mineral Resources: Mineral Resources Program	New Energy and Mineral Resources: Component - Mineral Resources Program - Mineral Resources Research, Surveys, and Assessments	New Energy and Mineral Resources: Component - Mineral Resources Program - National Minerals Information Center
Energy and Mineral Resources					
Energy Resources Program	33,365	33,365			
Mineral Resources Program	70,855		70,855	51,794	19,061

2025 Request

Former Budget Subactivities Surveys, Investigations and Research $000s	Former Budget Funding	New Energy and Mineral Resources: Energy Resources Program	New Energy and Mineral Resources: Mineral Resources Program	New Energy and Mineral Resources: Component - Mineral Resources Program - Mineral Resources Research, Surveys, and Assessments	New Energy and Mineral Resources: Component - Mineral Resources Program - National Minerals Information Center
Energy and Mineral Resources					
Energy Resources Program	39,491	39,491			
Mineral Resources Program	80,842		80,842	54,959	25,883

Proposed Organization Chart



Good Accounting Obligation in Government Act Report (All Bureaus/Offices)

The Good Accounting Obligation in Government Act (GAO-IG Act, P.L. 115-414) enacted January 3, 2019, requires that Agencies report the status of each open audit recommendation issued more than one year prior to the submission of the Agency's annual budget justification to Congress. The Act requires Agencies to include the current target completion date, implementation status, and any discrepancies on closure determinations.

The Department of the Interior leadership takes audit follow-up very seriously and considers our external auditors, to include the Government Accountability Office (GAO) and Office of the Inspector General, valued partners in not only improving the Department's management and compliance obligations but also enhancing its programmatic and administrative operations. As stewards of taxpayer resources, the Department applies cost-benefit analysis and enterprise risk management principles in recommendation implementation decisions. The Department's GAO-IG Act Report will be available at the following link: https://www.doi.gov/cj

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Budget at a Glance

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Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
Ecosystems	**307,176**	**307,176**	**+5,228**	**+0**	**+13,721**	**326,125**
Environmental Health Program	**30,457**	**30,457**	**+572**	**+0**	**+975**	**32,004**
Contaminant Biology	***12,528***	***12,528***	***+286***	***+0***	***+438***	***13,252***
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+438	[438]
Toxic Substances Hydrology	***17,929***	***17,929***	***+286***	***+0***	***+537***	***18,752***
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+537	[537]
Species Management Research Program	**63,904**	**63,904**	**+1,096**	**+0**	**+1,850**	**66,850**
USA National Phenology Network	[500]	[500]	+0	+0	-500	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,350	[2,350]
Land Management Research Program	**54,806**	**54,806**	**+1,045**	**+0**	**+4,700**	**60,551**
Chesapeake Bay	[8,000]	[8,000]	+0	+0	-2,300	[5,700]
Sagebrush Sea Ecosystems	[1,750]	[1,750]	+0	+0	-1,000	[750]
Migration Science for Huntable Big Game Populations (Migration Corridor Mapping)	[412]	[412]	+0	+0	+3,500	[3,912]
Actionable Science Tools for Drought Response	[0]	[0]	+0	+0	+3,000	[3,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,500	[1,500]
Biological Threats and Invasive Species Research Program	**46,622**	**46,622**	**+915**	**+0**	**-2,071**	**45,466**
Invasive Carp	[11,000]	[11,000]	+0	+0	-380	[10,620]
Chronic Wasting Disease	[4,970]	[4,970]	+0	+0	-1,250	[3,720]
Tick Management and Research	[2,000]	[2,000]	+0	+0	-2,000	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,559	[1,559]

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
Cooperative Research Units Program	**28,206**	**28,206**	**+672**	**+0**	**+895**	**29,773**
Brown Bullhead Research	[250]	[250]	+0	+0	-250	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,145	[1,145]
Climate Adaptation Science Center and Land Change Science Program (OLD)	**83,181**	**83,181**	**+0**	**-83,181**	**+0**	**0**
Land Change Science (OLD)	***20,066***	***20,066***	***+0***	***-20,066***	***+0***	***0***
Transfer to Ecosystems Change Research Program	[20,066]	[20,066]	+0	-20,066	+0	[0]
National and Regional Climate Adaptation Science Centers (OLD)	***63,115***	***63,115***	***+0***	***-63,115***	***+0***	***0***
Transfer to National and Regional Climate Adaptation Science Centers	[63,115]	[63,115]	+0	-63,115	+0	[0]
Ecosystems Change Research Program (NEW)	**0**	**0**	**+464**	**+0**	**+1,651**	**22,181**
Transfer from Land Change Science Program	[0]	[0]	+0	+20,066	+0	[20,066]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,651	[1,651]
National and Regional Climate Adaptation Science Centers (NEW)	**0**	**0**	**+464**	**+0**	**+5,721**	**69,300**
Support for Climate Adaptation Science Centers	[42,335]	[42,335]	+0	+0	+3,000	[45,335]
Coordinating Federal Capacity to Build Climate Resilience	[0]	[0]	+0	+0	+1,000	[1,000]
USGCRP/National Nature Assessment	[400]	[400]	+0	+0	+1,000	[1,400]
Transfer from National and Regional Climate Adaptation Science Centers	[0]	[0]	+0	+63,115	+0	[63,115]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+721	[721]
Energy and Mineral Resources	**104,220**	**104,220**	**+2,241**	**+0**	**+13,872**	**120,333**

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
Energy Resources Program	**33,365**	**33,365**	**+659**	**+0**	**+5,467**	**39,491**
Inventory of Subsurface Storage Capacity	[755]	[755]	+0	+0	+1,875	[2,630]
Geothermal Energy	[2,065]	[2,065]	+0	+0	+1,840	[3,905]
Geologic Carbon Sequestration	[3,177]	[3,177]	+0	+0	+300	[3,477]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,452	[1,452]
Mineral Resources Program (OLD)	**70,855**	**70,855**	**+0**	**-70,855**	**+0**	**0**
Transfer to National Minerals Information Center	[19,061]	[19,061]	+0	-19,061	+0	[0]
Transfer to Mineral Resources Research, Surveys and Assessments	[51,794]	[51,794]	+0	-51,794	+0	[0]
Mineral Resources Program (NEW)	**0**	**0**	**+1,582**	**+70,855**	**+8,405**	**80,842**
National Minerals Information Center	***0***	***0***	***+482***	***+19,061***	***+6,340***	***25,883***
Critical Minerals Supply Chain Analysis and Forecasting	[0]	[0]	+0	+2,865	+5,580	[8,445]
Supply Chain Research for Emerging Technologies	[1,670]	[1,670]	+0	-1,670	+0	[0]
Critical Minerals - Forecasting	[1,195]	[1,195]	+0	-1,195	+0	[0]
Transfer from Mineral Resources Program	[0]	[0]	+0	+19,061	+0	[19,061]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+760	[760]
Mineral Resources Research, Surveys and Assessments	***0***	***0***	***+1,100***	***+51,794***	***+2,065***	***54,959***
Transfer from Mineral Resources Program	[0]	[0]	+0	+51,794	+0	[51,794]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,065	[2,065]
Natural Hazards	**200,256**	**200,256**	**+3,561**	**+0**	**+6,824**	**210,641**
Earthquake Hazards Program	**92,651**	**92,651**	**+1,264**	**+0**	**+951**	**94,866**

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
Subduction Zone Science	[2,700]	[2,700]	+0	+0	+1,500	[4,200]
Earthscope Stations for Alaska	[3,000]	[3,000]	+0	+0	-1,463	[1,537]
EEW/ShakeAlert - Geodesy	[28,600]	[28,600]	+0	+0	-1,500	[27,100]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,414	[2,414]
Volcano Hazards Program	**37,500**	**37,500**	**+801**	**+0**	**+1,383**	**39,684**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,383	[1,383]
Landslide Hazards Program	**14,432**	**14,432**	**+253**	**+0**	**-648**	**14,037**
Cooperative Landslide Hazards and Assessment Competitive Grant Program	[1,000]	[1,000]	+0	+0	-1,000	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+352	[352]
Global Seismographic Network Program	**7,273**	**7,273**	**+63**	**+0**	**+100**	**7,436**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+100	[100]
Geomagnetism Program	**5,251**	**5,251**	**+74**	**+0**	**+119**	**5,444**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+119	[119]
Coastal/Marine Hazards and Resources Program	**43,149**	**43,149**	**+1,106**	**+0**	**+4,919**	**49,174**
R&D Informing Climate-Related Risk Assessments	[0]	[0]	+0	+0	+2,800	[2,800]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,119	[2,119]
Water Resources	**304,434**	**304,434**	**+4,857**	**+0**	**+263**	**309,554**
Water Availability and Use Science Program	**74,296**	**74,296**	**+1,193**	**+0**	**+6,523**	**82,012**
Integrated Water Availability Assessments	[7,475]	[7,475]	+0	+0	+12,000	[19,475]
Mississippi Alluvial Plain IWAA	[2,000]	[2,000]	+0	+0	-2,000	[0]

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
OpenET	[3,500]	[3,500]	+0	+0	-3,000	[500]
Hydrologic Science Talent Pipeline	[2,000]	[2,000]	+0	+0	-2,000	[0]
Water Cycle Center	[5,000]	[5,000]	+0	+0	-5,000	[0]
Actionable Science Tools for Drought Response	[0]	[0]	+0	+0	+4,000	[4,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,523	[2,523]
Cooperative Matching Funds	[13,598]	[13,598]	+0	+0	+0	[13,598]
Groundwater and Streamflow Information Program	**114,558**	**114,558**	**+1,878**	**+0**	**+4,954**	**121,390**
Federal Priority Streamgages	[25,715]	[25,715]	+0	+0	+4,600	[30,315]
Hydrologic Science Talent Pipeline	[2,000]	[2,000]	+0	+0	-2,000	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,354	[2,354]
Cooperative Matching Funds	[30,664]	[30,664]	+0	+0	+0	[30,664]
National Water Quality Program	**100,080**	**100,080**	**+1,786**	**+0**	**+4,286**	**106,152**
National Groundwater Quality Network	[3,699]	[3,699]	+0	+0	+1,250	[4,949]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+3,036	[3,036]
Cooperative Matching Funds	[22,267]	[22,267]	+0	+0	+0	[22,267]
Water Resources Research Act Program	**15,500**	**15,500**	**+0**	**+0**	**-15,500**	**0**
Water Resources Research Institutes	[15,500]	[15,500]	+0	+0	-15,500	[0]
Core Science Systems	**284,607**	**284,607**	**+2,947**	**+0**	**+25,462**	**313,016**
National Geospatial Program	**93,650**	**93,650**	**+1,065**	**+0**	**-8,468**	**86,247**
3D Elevation Program (3DEP)	[42,905]	[42,905]	+0	+0	-6,250	[36,655]
Alaska Mapping and Map Modernization	[10,000]	[10,000]	+0	+0	-2,278	[7,722]

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
3D National Topography Model (3DNTM)/3D Hydrography Component	[500]	[500]	+0	+0	+1,000	[1,500]
Digital Surface Models	[3,000]	[3,000]	+0	+0	-3,000	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+2,060	[2,060]
National Cooperative Geologic Mapping Program	**44,556**	**44,556**	**+665**	**+0**	**+1,096**	**46,317**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,096	[1,096]
Science Synthesis, Analysis and Research Program	**30,480**	**30,480**	**+406**	**+0**	**+5,766**	**36,652**
High-Performance Computing/Supercomputing	[3,650]	[3,650]	+0	+0	+2,000	[5,650]
The American Conservation and Stewardship Atlas	[0]	[0]	+0	+0	+2,500	[2,500]
Conservation.gov	[0]	[0]	+0	+0	+500	[500]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+766	[766]
National Land Imaging Program	**115,921**	**115,921**	**+811**	**+0**	**+27,068**	**143,800**
Satellite Operations	**92,184**	***92,184***	***+276***	***+0***	***+18,047***	***110,507***
Sustainable Land Imaging Development-Landsat Next	[91,334]	[91,334]	+0	+0	+12,000	[103,334]
Commercial Satellite Data Pilot	[0]	[0]	+0	+0	+5,000	[5,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,047	[1,047]
Science Research and Investigations	**23,737**	***23,737***	***+535***	***+0***	***+9,021***	***33,293***
Remote Sensing State Grants	[1,465]	[1,465]	+0	+0	-215	[1,250]
Enhancing Landscape Measurements, Data, and Analysis	[0]	[0]	+0	+0	+3,700	[3,700]
National Land Use Data Products	[0]	[0]	+0	+0	+1,500	[1,500]
Natural Capital Accounting	[220]	[220]	+0	+0	+3,000	[3,220]

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+1,036	[1,036]
Science Support	**106,304**	**106,304**	**+2,597**	**+0**	**+9,330**	**118,231**
Administration and Management Program	**82,179**	**82,179**	**+2,267**	**+0**	**+8,551**	**92,997**
USGS Laboratories	[0]	[0]	+0	+0	+1,735	[1,735]
Zero Emission Vehicles	[250]	[250]	+0	+0	+964	[1,214]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+5,852	[5,852]
Information Services Program	**24,125**	**24,125**	**+330**	**+0**	**+779**	**25,234**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+779	[779]
Facilities	**188,051**	**188,051**	**-12,632**	**+0**	**+4,979**	**180,398**
Rental Payments and Operations & Maintenance Program	**113,211**	**113,211**	**-12,643**	**+0**	**+5,141**	**105,709**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+5,141	[5,141]
Facilities Maintenance, Modernization and Restoration Program	**74,840**	**74,840**	**+11**	**+0**	**-162**	**74,689**
Department of the Interior Field Communications Modernization (DIFCOM)	[176]	[176]	+0	+0	-176	[0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	+0	+0	+14	[14]
Special Initiatives - 2023	**[2,130]**	**[2,130]**	**+0**	**+0**	**-2,130**	**[0]**
Fixed Costs	**0**	**0**	**+8,799**	**+0**	**+0**	**[8,799]**
TOTAL, SIR w/o Supplemental Funding	**1,497,178**	**1,497,178**	**+8,799**	**+0**	**+72,321**	**1,578,298**
2022 Bipartisan Infrastructure Law (P.L. 117-58)[1]	**68,655**	**68,655**	**+0**	**+0**	**+0**	**68,655**
2023 Disaster Supplemental (P.L. 117-328)[1]	**41,040**	**0**	**+0**	**+0**	**+0**	**0**

Budget At A Glance Table

U.S. Geological Survey

Dollars in Thousands ($000)

Appropriation: Surveys, Investigations, & Research	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Change (+/-)	2025 Request
Contributed Funds	**655**	**508**	**+0**	**+0**	**+0**	**507**
Quarters	**60**	**67**	**+0**	**+0**	**+0**	**68**
TOTAL, SIR w/ Supplemental and Permanent Funding	**1,607,588**	**1,566,408**	**+8,799**	**+0**	**+72,321**	**1,647,528**

[1] BIL and Other Supplemental Funding displayed reflects the amounts made available in the fiscal year not estimated allocations or obligations.

Ecosystems

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Ecosystems

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Environmental Health Program	**30,457**	**30,457**	**+572**	**0**	**+975**	**32,004**	**+1,547**
FTE	***132***	***132***	***0***	***0***	***+0***	***132***	***+0***
Species Management Research Program	**63,904**	**63,904**	**+1,096**	**0**	**+1,850**	**66,850**	**+2,946**
FTE	***253***	***253***	***0***	***0***	***-2***	***251***	***-2***
Land Management Research Program	**54,806**	**54,806**	**+1,045**	**0**	**+4,700**	**60,551**	**+5,745**
FTE	***237***	***237***	***0***	***0***	***+14***	***251***	***+14***
Biological Threats and Invasive Species Research Program	**46,622**	**46,622**	**+915**	**0**	**-2,071**	**45,466**	**-1,156**
FTE	***211***	***211***	***0***	***0***	***-17***	***194***	***-17***
Cooperative Research Units Program	**28,206**	**28,206**	**+672**	**0**	**+895**	**29,773**	**+1,567**
FTE	***155***	***155***	***0***	***0***	***+0***	***155***	***+0***
Climate Adaptation Science Center and Land Change Science Program (OLD)	**83,181**	**83,181**	**+0**	**-83,181**	**+0**	**0**	**-83,181**
FTE	***214***	***214***	***0***	***-214***	***+0***	***0***	***-214***
Ecosystems Change Research Program (NEW)	**0**	**0**	**+464**	**+20,066**	**+1,651**	**22,181**	**+22,181**
FTE	***0***	***0***	***0***	***+109***	***+0***	***109***	***+0***
National and Regional Climate Adaptation Science Centers (NEW)	**0**	**0**	**+464**	**+63,115**	**+5,721**	**69,300**	**+69,300**
FTE	***0***	***0***	***0***	***+105***	***+3***	***108***	***+3***
Ecosystems Total	**307,176**	***307,176***	***+5,228***	***0***	***+13,721***	***326,125***	***+18,949***
FTE	***1,202***	***1,202***	***0***	***0***	***-2***	***1,200***	***-2***

The 2025 budget request for the Ecosystems Mission Area is $326,125,000 and 1,200 FTE, a program change of +$13,721,000 and -2 FTE from the 2024 Continuing Resolution (CR).

Mission Area Overview

The quality of life in the U.S. and the Nation's economic strength depends on healthy ecosystems that support living organisms and natural processes. The Ecosystems Mission Area (EMA) conducts research that helps to conserve these vital interests by providing policy-neutral and actionable science supporting the management of more than 480 million acres of Department of the Interior (Interior) lands across the Nation. The EMA is the biological research arm of the Interior and provides the science, tools, and decision support needed to ensure the Nation's ecosystems are managed sustainably and that biological resources are conserved now and into the future. The breadth and scope of EMA is large and includes a broad range of capacities in ecology, biology, chemistry, toxicology, microbiology, modeling, and applied machine learning. This research is conducted within the broader mission of the USGS to serve the Nation by providing science that advances understanding of our natural resources and informs land and water stewardship. Scientists in EMA develop tools and decision support for the resource managers entrusted with the stewardship of Interior lands and the ecosystems within them that are a significant national asset. This includes science that:

- Managers, policy makers, and others use for decisions that ***protect, conserve, and improve*** fish and wildlife populations across the U.S. and beyond.
- Improves the effectiveness of land management and informs ***restoration of priority ecosystems*** on millions of acres, including public lands such as national parks, national wildlife refuges, and other landscapes that support the biodiversity of fish, wildlife, and plant species, as well as thriving economies.
- Delivers information used to ***protect public safety, property, and ecosystems*** from wildfires, invasive plants, animals, and infectious fish and wildlife diseases that pose significant ecologic and economic threats to the resources of the U.S.
- Informs stakeholder decisions to manage fish and wildlife health and provides ***environmental exposure information*** as well as information on toxicological or pathogenic disease agents to partners in public health.
- Works closely with partners and stakeholders to examine regional issues related to ***climate impacts and adaptation strategies.***
- Advances foundational understanding of the patterns, processes, and impacts (past, present, and future) of changing climate and land use on ecosystems to ***improve projections of change under different management scenarios and strengthen the Nation's ability to respond and adapt to stressors***.
- Informs natural resource-related decisions that affect ***ecosystems and public safety*** in the face of disturbances (e.g., droughts, fire, sea level change, and changing temperatures), extreme events (e.g. hurricanes and avalanches), and long-term impacts of land use (e.g. urbanization, agriculture, and water management.)
- Meets the actionable science needs of cooperators, provides technical assistance, and develops the ***future conservation workforce*** through training, fellowships, and mentoring.
- Improves the evidence-based approach to conservation and ecosystem restoration in the United States, supports the ***American Conservation and Stewardship Atlas***, and provides a foundation for publicly available information on national conservation and restoration efforts.

EMA science is essential for resource management decisions that protect and conserve the lands and waters that are enjoyed by communities across the Nation and provide critical habitat for fish, wildlife, and plant species. The EMA delivers innovative, decision-relevant, and forward-thinking science and develops new management tools and techniques using many methods, including remote sensing, artificial intelligence/machine learning, data visualization, and crowdsourcing to produce timely information to meet diverse stakeholder needs.

The work of the EMA ranges from molecular-level to ecosystem-scale studies, but the common thread across these efforts is the science to advance the understanding of biological resources. The EMA funds a wide variety of USGS capabilities and consists of seven national programs supporting research conducted at 15 Ecological Science Centers with numerous field stations, a National Climate Adaptation Science Center, nine Regional Climate Adaptation Science Centers, 43 Cooperative Research Units, and a broad range of other USGS science centers.

FY 2023 Selected Mission Area Accomplishments

- The USGS contributed significantly to national strategic fire assessments and science advancement. These activities provided information to Interior, the U.S. Department of Agriculture (USDA), Tribal, State, and local entities to aid in mitigating risk and increasing resiliency of the Nation's ecosystems and communities. This included contributing to updates of the National Cohesive Wildland Fire Management Strategy and the Congressionally-established Wildland Fire Mitigation and Management Commission report. This work builds on and supports the historic investment of funds under the Bipartisan Infrastructure Law (BIL) for wildland fire science and the implementation of mitigation strategies to reduce the risk of and plan for recovery from catastrophic wildfires.
- The USGS initiated a national invasive species horizon scanning process to support early detection and rapid response (EDRR). The project team reviewed over 70,000 plant species, 3,000 invertebrate species, and 25,000 vertebrate species and in FY 2024 will be building taxa-specific subject-matter expert review teams that will score those species based on their risk of becoming established and invasive in the U.S. This project will provide a prioritized species list that will then be used in hotspot analysis to look at the landscape and determine areas where those species are predicted to occur, which will help direct EDRR surveillance efforts. More strategic surveillance and biosecurity resulting from the horizon scan results will enhance capacity to reduce impacts of new invasive species in the U.S.
- In response to S.O. 3362, an order directing the Interior to work with numerous western states to improve the quality of big-game winter range and migration corridor habitat on Interior lands, the USGS published Volume 3 of "Ungulate Migrations of the Western United States". The current volume includes maps and summaries of 45 mule deer, white-tailed deer, pronghorn, and elk migration routes in Arizona, California, Idaho, New Mexico, Utah, Washington, Wyoming, and for the first time, the Navajo Nation. The entire series includes details and maps of the migrations and seasonal ranges for a total of 152 herds along with insights into how migration maps are being used in conservation planning. State and Tribal wildlife agencies in partnership with transportation agencies have used the migration maps to plan and construct wildlife underpasses and overpasses that allow animals to safely cross major highways or to develop message boards and automatic systems along highways to alert drivers of crossing animals. Maps are also being

used to remove fences, inform recreation planning, guide siting of renewable energy projects, and limit housing development in migration corridors through zoning and conservation easements. The broader corridor-mapping effort illustrates how collaborations among State, Federal, and Tribal agencies and private landowners can help wildlife coexist with human populations even as western landscapes undergo major changes.

- The USGS hosted a webinar series on how to weave together Indigenous Knowledges (IK) with Federal research and resource management programs. The series centered on Indigenous voices to explore ethical, legal, and scientific considerations for working within different knowledge systems and provide guidance reflecting best practices. Speakers explored what it means to ethically engage with IK in resource management and conservation. Participants heard from Tribal and Indigenous communities about the frameworks they use to protect and share their knowledges and from Federal agencies about how they navigate their responsibility to foster respectful, mutually beneficial relationships with knowledge holders.
- Per- and polyfluoroalkyl substances (PFAS) are a widely used diverse group of chemicals found across the globe in aquatic and terrestrial ecosystems and in sources of drinking water. Some types have been linked to serious health effects in humans and animals. USGS research in EMA focuses on national-scale efforts examining the occurrence of PFAS in biota and drinking water resources, understanding how PFAS moves through the environment, and determining the exposure to, and potential effects of, PFAS mixtures on wildlife, humans, and ecosystems. In 2023, a national reconnaissance study of PFAS in tap water was published. The publication and a web dashboard built to showcase the results were nationally recognized as invaluable for providing information to the public on potential risks to PFAS exposure and received over 6,000 views the first week. In addition, the USGS continued to advance several lines of PFAS research, including developing new analytical methods for measuring PFAS in the environment, national reconnaissance to determine the levels of PFAS in the tissues of fish and wildlife, working with the USGS Water Resources Mission Area to develop predictive models of PFAS concentrations in groundwater across the Nation, and developing a geospatial tool to map and display PFAS-related data. Efforts of these types help the public and decision makers better understand the scope and complexity of PFAS in the environment and the possibility for human exposure pathways.
- The USGS and the U.S. Fish and Wildlife Service (USFWS) collaborated on a study focusing on changes in polar bear behavior during the summer in the Chukchi and southern Beaufort Sea. The study found that more polar bears are spending time on land for longer periods, bringing them closer to human activities and settlements. This shift in behavior limits their access to their primary food sources. Given that human conflict significantly affects the conservation of large carnivores like polar bears, managing interactions between bears and humans on land is becoming increasingly crucial for their conservation. Understanding these conflicts better can help reduce risks to people and communities while also safeguarding polar bears, which hold cultural significance for Indigenous peoples and serve as an important food source.
- USGS scientists led a study that determined that methane emissions from prairie pothole wetlands are likely to increase by 2-3 times by 2100 due to rising temperatures. This means that natural sources of greenhouse gases will increase and need to be accounted for as the international community works to meet greenhouse gas targets. The study used an exceptionally large methane flux dataset and remotely sensed data to model wetland methane emissions in the Prairie Pothole

Region, which is the largest North American wetland complex. This research contributes to the Nation's understanding of how future climate change impacts, particularly warming temperatures, will affect freshwater wetlands and their natural greenhouse gas emissions. This understanding can help inform planning and policies regarding targets for both natural and human greenhouse gas concentrations.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

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Ecosystems
Environmental Health Program

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Environmental Health Program	**30,457**	**30,457**	**+572**	**0**	**+975**	**32,004**	**+1,547**
Contaminant Biology	**12,528**	**12,528**	**+286**	**0**	**+438**	**13,252**	**+724**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	0	+438	[438]	[+438]
Toxic Substances Hydrology	**17,929**	**17,929**	**+286**	**0**	**+537**	**18,752**	**+823**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	0	+537	[537]	[+537]
FTE	***132***	***132***	***0***	***0***	***+0***	***132***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the Environmental Health Program is $32,004,000 and 132 FTE, a program change of +$975,000 and +0 FTE from the 2024 CR.

Baseline Capacity - 2024 Fixed Costs (+$975,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $438,000 for Contaminant Biology and $537,000 for Toxic Substances Hydrology in the Environmental Health Program, which reflects the incremental amount needed to cover fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

The U.S. has an abundance of natural resources that are vital to its health and well-being and economic security. Toxicological or pathogenic disease agents in the environment (collectively referred to as "environmental contaminants") can pose a threat to the health and sustainability of these resources. The "One Health" paradigm recognizes that the health of humans, plants, animals, and the environment are inextricably linked and that successful efforts to protect and improve the health of natural resources and people require an interdisciplinary approach. The Environmental Health (EH) Program uses this "One Health" approach to deliver science focused on documenting, better understanding, and mitigating some of the highest priority health threats associated with environmental contaminants. EH Program science is used by resource managers and other stakeholders to protect, balance, and optimize the health of people, animals, and ecosystems. The EH Program brings together interdisciplinary teams of ecologists,

The EH Program supports integrated natural science expertise and capabilities across the USGS related to environmental contaminants and pathogens. The EH Program supports science to address the full range of questions related to contaminant and pathogen sources, environmental transport, exposure/transmission pathways, uptake, biological effects, and human health implications. This science informs stakeholder decisions to manage fish and wildlife health and provides environmental exposure information to partners in public health.

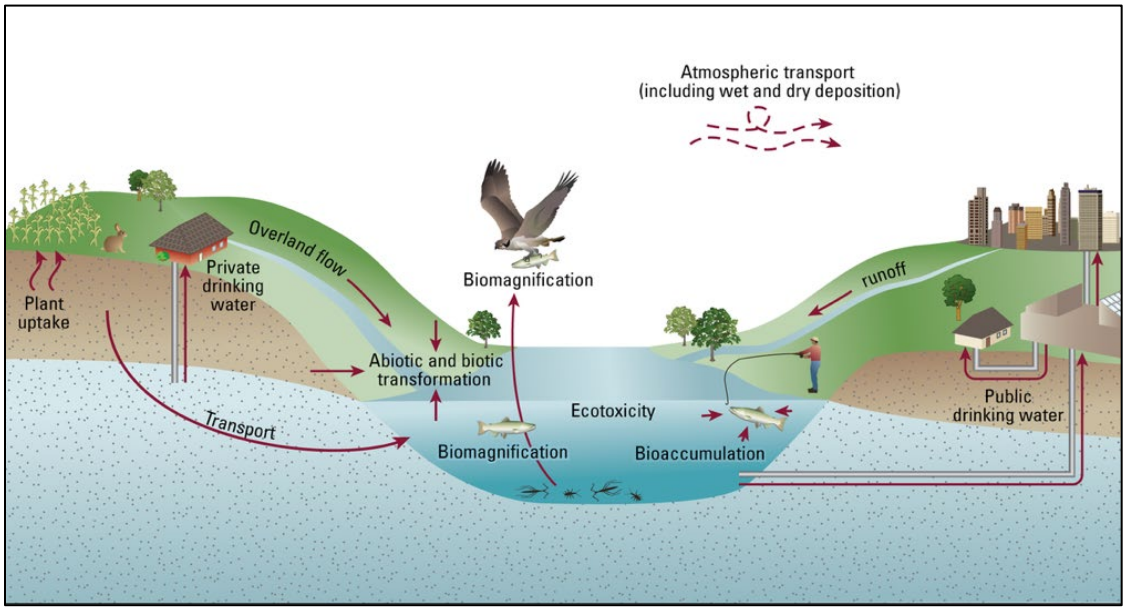
biologists, hydrologists, geologists, chemists, toxicologists, microbiologists, and modelers who advance USGS scientific understandings of environmental contaminant exposures and hazard mitigation. EH Program scientists investigate environmental exposures to a range of naturally occurring and human-sourced contaminants, including mercury, lead, arsenic, natural and synthetic hormones, pharmaceuticals, PFAS, and pesticides; pathogens such as avian influenza, viruses, and antibiotic-resistant bacteria and genes; and a variety of algal toxins produced by harmful algal blooms. The integration of natural-science disciplines produces extensive, comprehensive, peer-reviewed science and actionable data and related decision tools for situational awareness, planning, and forecasting.

The EH Program is a national leader in science related to health risks posed by contaminants and pathogens in the environment, such as mercury, arsenic, pesticides, chemicals used for fire and dust control, pathogens, and mineral and energy by-products. It provides Federal and State public health partners with information they need on the sources of contaminants, how they travel through the environment, and the exposure and possible effects to fish, wildlife, and the public. For example, in response to the recent increase in public concern over PFAS in water resources and drinking water and the need for information on this topic, the USGS supports a cross disciplinary team of experts focused on PFAS identification and analyses and on understanding occurrence, fate and transport in the environment, wildlife and human exposure, and bioaccumulations and effects on wildlife. Some USGS activities include: 1) developing models for quantifying and assessing source of PFAS in watersheds and aquifers to understand the role of municipal and wastewater effluents; 2) conducting National evaluations of PFAS occurrence in ambient water resources; 3) creating national maps that depict the occurrence of PFAS in both water resources and soils; 4) creating a comprehensive listing of the most frequently detected types of PFAS in the environment; and 5) conducting field studies of PFAS to validate laboratory experiments.

USGS is studying the potential effects of PFAS in diamondback terrapins along the mid-Atlantic coast. Source: USGS.

A multitude of stakeholders, including State agencies, the Environmental Protection Agency (EPA), the USFWS, the Centers for Disease Control and Prevention (CDC), the USDA, non-governmental organizations, academia, and industry use the EH Program's science, data, and tools to identify, understand, and prioritize management practices that reduce the risk of environmental contamination. Working with partners, the EH Program contributes to a foundation of knowledge for a range of land and other resource management and related economic decisions such as maintaining the safety of harvested

fish and wildlife species; the re-use of solid and liquid wastes from municipal, energy, and mineral activities; and protection of recreational and drinking water resources.



Conceptual diagram of per- and polyfluoroalkyl substance (PFAS) sources, movement, and exposures in a watershed. Source: USGS.

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Ecosystems
Species Management Research Program

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Species Management Research Program	**63,904**	**63,904**	**+1,096**	**0**	**+1,850**	**66,850**	**+2,946**
USA National Phenology Network	[500]	[500]	[0]	0	-500	[0]	[+0]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	0	+2,350	[2,350]	[+2,350]
FTE	***253***	***253***	***0***	***0***	***-2***	***251***	***-2***

Justification of 2025 Program Changes

The 2025 budget request for the Species Management Research Program is $66,850,000 and 251 FTE, a program change of +$1,850,000 and -2 FTE from the 2024 CR.

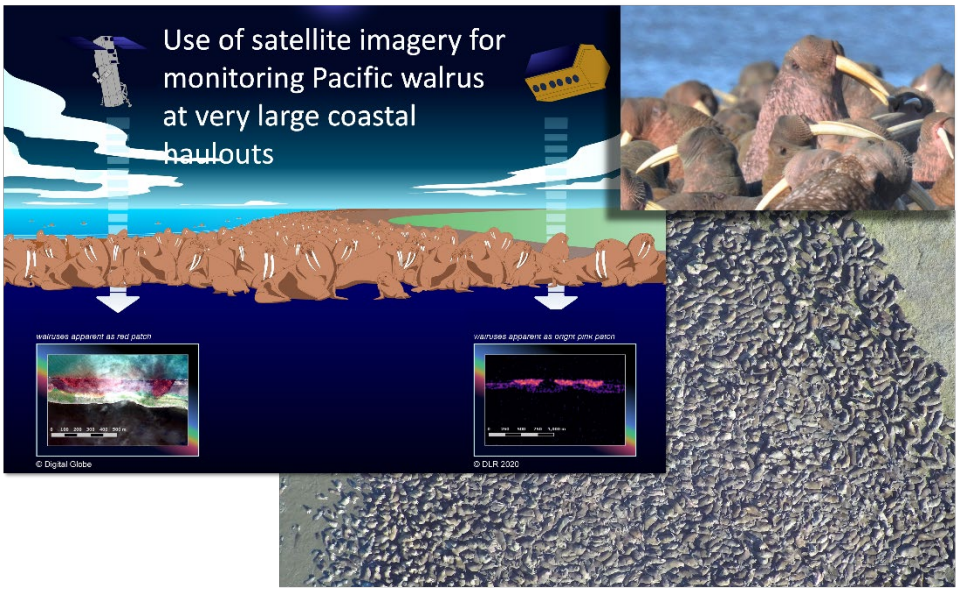
USA National Phenology Network (-$500,000 / -2 FTE) – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

Baseline Capacity - 2024 Fixed Costs (+$2,350,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $2,350,000 in the Species Management Research Program, which reflects the incremental amount needed to cover fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

Fish, wildlife, and their habitats are critical to preserving ecosystems and the benefits they provide to society nation-wide. Outdoor recreation on our public lands is a part of America's heritage and provides important inputs to local economies largely located in rural America. Millions of people visit our Federal public lands annually for hunting, fishing, bird watching, boating, hiking, and biking. The methods used to conserve and protect fish and wildlife and their habitats are supported by trusted scientific information provided by the USGS. The Species Management Research Program (SMRP) works directly with managers, policy makers, and others to provide the information needed for decisions that sustain healthy fish and wildlife populations, such as tools to manage sustainable harvests, strategies for cost-efficient fish and wildlife monitoring, and guidance to mitigate natural and human-caused threats to species. SMRP science and technology provide practical methods and information to assist in managing public lands and waters, including conventional and renewable energy development options that yield minimal impact on fish and wildlife and their habitats.

Biodiversity, both nationally and globally, is declining, driven by natural and human-induced stressors. Biodiversity loss can have far-reaching impacts on ecosystem resilience, biodiversity, and ecosystem services. Safeguarding the diversity of the Nation's fish and wildlife requires a deep understanding of how species, including iconic species like cutthroat trout, grizzly bears, and golden eagles, react to environmental change and how management actions can influence their sustainability and conservation. The SMRP provides targeted science that addresses temperature change, land use change, drought, and other stressors to produce decision-relevant science that helps land and water resource managers, including those at the Interior, make well-informed strategic management decisions that improve species conservation.



USGS scientists use a combination of satellite imagery, UAV-imagery, ground, and sea-based surveys to answer the question "how many" for important populations of animals - like the Pacific walrus. With the loss of sea ice, walruses are "hauling out" more on land, providing new challenges, but also new opportunities for measuring the health of the populations. Source: USGS.

On the ground, Federal and State resource management agencies, Tribes, non-governmental organizations, industry, and the public rely on SMRP information for various activities related to compliance with regulations, habitat conservation, mitigation practices, and more. SMRP science supports resource managers in meeting societal expectations amidst multiple—and sometimes competing—use scenarios by addressing the diversity of species stressors and environmental changes. SMRP is able to provide information that addresses these diverse and complex challenges, and the needs and concerns of all communities, including underserved communities, and can be incorporated into decision-making processes.

The SMRP focuses on resolving uncertainties in aquatic and terrestrial species biology and population status. Collaborating with various agencies and stakeholders, it is researching over 160 at-risk species, identifying stressors, preserving biodiversity, informing Endangered Species Act (ESA) listing decisions, identifying important wildlife corridors, and predicting species adaptations to environmental and other factors. This science helps managers prioritize lands and waters for protection, conservation, and restoration actions for species.

Water is a critical resource, and water management decisions can have major implications. The SMRP works collaboratively with the USGS Water Resources Mission Area (WMA) to explore the link between ecosystems and water (ecohydrology). Integrating data from various studies improves the bureau's ability to model how extreme hydrological events like drought and floods impact species, especially those that

are culturally significant to Tribes and vulnerable communities. SMRP areas of emphasis with the WMA include the Delaware, Upper Colorado, and Willamette River basins.

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Ecosystems
Land Management Research Program

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Land Management Research Program	**54,806**	**54,806**	**+1,045**	**0**	**+4,700**	**60,551**	**+5,745**
Chesapeake Bay	[8,000]	[8,000]	[0]	[0]	-2,300	[5,700]	[-2,300]
Sagebrush Sea Ecosystems	[1,750]	[1,750]	[0]	[0]	-1,000	[750]	[-1,000]
Migration Science for Huntable Big Game Populations (Migration Corridor Mapping)	[412]	[412]	[0]	[0]	+3,500	[3,912]	[+3,500]
Actionable Science Tools for Drought Response	[0]	[0]	[0]	[0]	+3,000	[3,000]	[+3,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,500	[1,500]	[+1,500]
FTE	***237***	***237***	***0***	***0***	***+14***	***251***	***+14***

Justification of 2025 Program Changes

The 2025 budget request for the Land Management Research Program is $60,551,000 and 251 FTE, a program change of +$4,700,000 and +14 FTE from the 2024 CR.

Chesapeake Bay (-$2,300,000 / -10 FTE) – The budget reduces funds for this program to allow the USGS to focus on higher priority research activities.

Sagebrush Sea Ecosystems (-$1,000,000 / -5 FTE) – The budget reduces funds for this program to allow the USGS to focus on higher priority research activities.

Migration Science for Huntable Big Game Populations (Migration Corridor Mapping) (+$3,500,000 / +17 FTE) – Migration is required for abundant big game herds, which sustain the hunting, subsistence, and tourism economies of the American West, but a clear understanding of where animals migrate across large landscapes is needed to inform conservation efforts and land-use planning across public and private lands. The USGS has unique expertise and technical capacity that has allowed it to lead a national effort to advance the science and management of big game migrations. In 2018, in response to Secretarial Order 3362, the USGS worked in partnership with western wildlife agencies to create a Corridor Mapping Team. The team has begun to map corridors of elk, mule deer, pronghorn, moose, and bison, with all 11 public land States participating in the effort. Building on these successes, a comprehensive, long-term plan has been developed that will leverage USGS science to implement a comprehensive effort to map migration corridors in the western U.S.

Wildlife corridor connectivity is central to the Administration's all-of-government approach to addressing the impacts of the climate crisis and the impact of human activity on habitat. This request would continue to support the Interior's science needs while making specific additional investments in the Department of the Interior's Conservation Strategy and the science needs of numerous Federal agencies, several Tribes, and western States.

The new effort would provide a full inventory of existing migrations and a science-delivery architecture to make migration maps viewable, publicly available, and actionable for conservation. This science initiative would include new studies in collaboration with western States and Tribes to map undocumented migrations, as well as new migration research on the impacts of climate change and development and best practices for mitigating such effects. This work would be implemented in collaboration with the Cooperative Research Units and associated universities in Wyoming, New Mexico, Montana, Oregon, and South Dakota, providing the added benefit of training of the next generation of wildlife managers.

Further, this work benefits ongoing collaborations with the USGS Core Science Systems (CSS) Mission Area to deliver story maps and data; provide a hub for migration data that is used by numerous science centers to address issues including surveillance for chronic wasting disease, informing restoration planning; and assess the effectiveness of habitat treatments.

Actionable Tools for Drought Response (+$3,000,000 / +12 FTE) – Prolonged droughts, particularly in the West, are causing fundamental shifts in our Nation's lands and waters. Stakeholders, including the agriculture industry and Federal, State, and local governments and Tribes, have an immediate need for drought information, data, and tools tailored to their workflows to inform operational decisions and actions. The USGS is well positioned to develop, in conjunction with our partners, state-of-the-art tools and actionable science to inform near-term land and water management, while also providing science to help guide longer-term management planning and decision-making efforts, particularly for potential transformational shifts in ecosystems. The USGS will leverage investments made in FY 2024 and previously to work with Interior and Tribal managers to accelerate development of relevant and authoritative data, indicators, scenarios, and new visualization tools for drought assessment and drought response decisions that are tailored to existing agency workflows. Co-production of science and targeted training will continue to be key components of both operational and long-term planning science support. Co-production would include partner-guided products that reflect the scale at which decisions are made and convening and engaging with our partners at all stages of the product life.

Given the impacts of long-term drought in the West and emerging drought in other parts of the U.S., it is important for the USGS to leverage its diverse expertise and partner relationships to provide support to decision makers and stakeholders across the western landscape. The USGS has supported extensive partner engagement throughout the Colorado River Basin with science to identify and begin to address these top priorities: 1) Enhanced understanding of the cascading effects of drought on ecosystems and socioeconomic factors; 2) Creation of a Colorado River Basin Science Hub to improve partners' access to and the findability of science, data, and tools; and, 3) Improved understanding of gains and losses of water as it moves through the basin from one Colorado River reservoir to another.

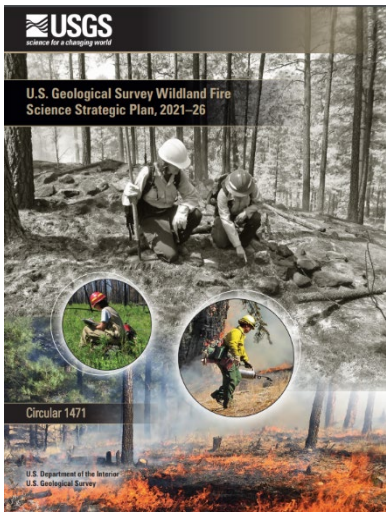
To address these priorities, the USGS, working with partners, will use advanced science and technology to deliver water predictions and drought risk assessment tools in support of management needs related to mitigating and responding to prolonged drought. The USGS will co-produce research with partners, including BLM, USFWS, NPS, BOR, States, and non-governmental organizations, to understand and quantify socioeconomic factors that drive and are driven by water issues in the Colorado River Basin. This would include water valuations, water use trade-offs, water balance with human and habitat dimensions, and assessment of management alternatives. Drought-driven risk assessments for water supply, wildfire, snowpack, soil moisture and habitat change, which are critical for managers to maintain robust ecosystems under projected changes, will be a top priority. The predictions and assessments, along with other fundamental information on how drought drives physical, biological, and chemical landscape change, will be used to evaluate: 1) watershed conditions on multiple-use public lands; 2) status of fish and wildlife species under various drought conditions; 3) drought impacts on agricultural production, rangeland management and food security; and 4) plans and investments for infrastructure, conservation, and restoration projects. Work will focus on the Colorado River Basin, and then extended to other areas as applicable.

Because drought is changing the way hydrological systems work, habitat suitability for fish and wildlife is also changing at a fine scale across broad regions of the country. Conservation decision-makers at USFWS, BLM, NPS, BOEM, BOR, States, Tribes, and other agencies need to know how the survival of fish and wildlife is changing at multiple scales, including small watersheds that are often the first to experience drought impacts and where information is scarce. The USGS has the combination of hydrological, ecological, and modeling expertise to develop an interactive tool that will allow decision-makers to explore the implications of drought for future species survival at the scale of decisions. This will improve decisions that affect habitat restoration, land conservation, and the fishery, sport fishing, and recreation industries by providing current and future species status metrics that incorporate impacts of changing weather conditions and unprecedented drought. Subsequent work will add new data layers and interactions, including allowing the user to explore water management scenarios.

Baseline Capacity - 2024 Fixed Costs (+$1,500,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and the other must pay requirements needed to continue to deliver the USGS mission. The budget includes $1,500,000 in the Land Management Research Program which reflects the incremental amount needed to cover the fixed cost requirements FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

Conserving or restoring ecosystem functions and processes at landscape or watershed scales is vital to maintaining biodiversity, cultural heritage, human communities, and the economy. The U.S. is home to



The USGS Wildland Fire Strategic Science Plan represents the most integrated and detailed plan for fire research to date in Federal government. It combines the extraordinary breadth of the USGS fire science activities into a coherent vision for how integrated, actionable fire science can help address the nation's wildfire problems, working closely with stakeholders. Source: USGS.

some of the most iconic landscapes in the world; places like the great American West, the Great Lakes, Chesapeake Bay, and the Everglades are treasures and contain critical ecosystems that support healthy populations of fish, wildlife, and plant species, as well as thriving regional and local economies. The Land Management Research Program (LMRP) seeks to understand how ecosystem components interact with each other and are affected by various stressors, such as habitat loss, pollution, and temperature changes across local to global scales, to provide land managers with science and data they need about resource conditions and land use interactions at the landscape scale to make informed and effective decisions. The LMRP describes how the physical, biological, and social components within landscapes interact across local to nation-wide scales.

The LMRP is working to transform the ability of Tribes, land-management agencies, landowner organizations, and local communities to plan and make informed decisions by co-producing integrated, scenario-based modeling and monitoring approaches. LMRP science brings together the information from ecosystem, socio-economic, remote-sensing, and management research. In FY 2025, the LMRP will continue working with partners to implement the USGS Landscape Science Strategy and co-produce science and tools that are used in natural resource management, such as those called for in the 2023 update to the National Cohesive Wildland Fire Management Strategy. A new focus for LMRP is supporting Interior bureaus with improved fire/postfire risk assessments and treatment effectiveness evaluation monitoring to reduce the negative impacts of wildfire. Using new state-of-the-art integrated data and models, these efforts aim to improve the quality, relevance, and timeliness of information available on land change, fire, hydrology, and ecosystem services to provide consistent, cross-disciplinary science products that can project the impact of important resource management decisions.

Newly planted rows of sagebrush for use in management efforts to restore lands lost or degraded from invasive annual grasses and rangeland fire. USGS collaboratively develops science to increase effectiveness of restoration efforts across the sagebrush biome. Source: USFWS, J. Strickland.

As part of long-term work on priority landscapes, the LMRP will continue to work with resource management agencies to provide science to support the Interior's 'Defend and Grow the Core' approach to conserving and restoring public lands in the sagebrush biome. In FY 2025, LMRP will expand efforts to improve technical transfer of existing science and to synthesize research on priority topics in support of complex multiple-use resource management decisions and National Environmental Policy Act planning. The LMRP will also increase focus on developing transferable methods that assess the

effectiveness and outcomes of ecosystem restoration efforts, including those supported by BIL.

USGS scientist conducting research on the extent of mangrove regeneration. Mangroves and coastal wetlands are important for many reasons including reducing the impact from coastal storms, maintaining biodiversity, and storing carbon. Source: USGS.

Coastal wetlands are well represented in USGS priority landscapes. While they are among the world's most valued ecosystems, they are also the most threatened by accelerated coastal flooding leading to major losses of wetlands. Coastal flooding absorbs existing coastal wetland ecosystems into the sea, causing the "migration" of coastal wetlands further landward. This is a cause for concern because depending on the local topography and coastal urbanization, there may be limited ability to accommodate such wetland migration further inland. There is intense debate regarding the extent to which landward migration of wetlands due to coastal flooding might be able to compensate for coastal wetland losses. Recent LMRP research shows that landward migration of coastal wetlands could transform coastlines and result in overall losses of coastal wetland habitats. Additionally, landward migration of coastal wetlands will replace existing coastal freshwater wetlands and valuable uplands, including croplands, forests, pastures, and grasslands. These analyses underscore the need for improved monitoring and research to prepare society for coastal transformations and reverse wetland losses. In FY 2025, the USGS will be advancing this work in coastal wetland habitats across the U.S.

Elk traveling across winter range in the northwestern Greater Yellowstone Ecosystem near the Gardiner River in Yellowstone National Park, 2008. Source: USGS.

The USGS Corridor Mapping Team, comprised of State, Federal, and Tribal representatives, has collaborated over the last six years to map migrations of mule deer, elk, pronghorn, and other ungulates. Mapped migrations are derived from on-the-ground knowledge of State or Tribal wildlife agencies and the USGS report series entitled *Ungulate Migrations of the Western United States*. Volume 1, Volume 2, and Volume 3 catalog the movements of approximately 150 ungulate herds moving across western States and Tribal lands. Across the western U.S., these

migration maps are used to guide development, locate roadway-crossing structures, target problematic fences, and identify critical private lands that support landscape connectivity.

In FY 2025, the LMRP and Cooperative Research Units Program plan to expand the geographic scope of this work to include Alaskan caribou, streamline delivery of maps to partners, and assess impacts of climate change, anthropogenic development, and the efficacy of mitigation efforts. Additionally, the USGS will expand efforts to coordinate connectivity research and decision support for multiple species and programs and develop an overarching USGS strategy for connectivity research. LMRP's focus will be on the synthesis, development, and delivery of connectivity methods that are actionable across multiple species and conservation challenges and that can be readily used by USGS partners in the U.S. land-management agencies to evaluate, maintain, and restore connectivity for diverse animal taxa. The LMRP will leverage the USGS's deep expertise on ecosystem patterns to better understand how to maintain connected habitats that allow animals to adjust their movements amid changing environmental conditions.

The LMRP provides science for understanding natural and human influences on lands, waters, and ecosystems under management responsibility of Interior bureaus and other Federal, State, and Tribal resource management partners. In FY 2025, the LMRP will increase research focused on applied science for Interior in support of conservation and climate adaptation. This information is indispensable as the Interior manages multiple resources and uses on public lands. The LMRP will support research in FY 2025 to identify and reduce or avoid resource management conflicts, support the transition to renewable energy, enhance and maintain public lands for future generations, and keep U.S. communities safe.

Ecosystems
Biological Threats and Invasive Species Research Program

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Biological Threats and Invasive Species Research Program	**46,622**	**46,622**	**+915**	**0**	**-2,071**	**45,466**	**-1,156**
Invasive Carp	[11,000]	[11,000]	[0]	[0]	-380	[10,620]	[-380]
Chronic Wasting Disease	[4,970]	[4,970]	[0]	[0]	-1,250	[3,720]	[-1,250]
Tick Management and Research	[2,000]	[2,000]	[0]	[0]	-2,000	[0]	[-2,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,559	[1,559]	[+1,559]
FTE	***211***	***211***	***0***	***0***	***-17***	***194***	***-17***

Justification of 2025 Program Changes

The 2025 budget request for the Biological Threats and Invasive Species Research Program is $45,466,000 and 194 FTE, a program change of -$2,071,000 and -17 FTE from the 2024 CR.

Invasive Carp (-$380,000 / -0 FTE) – The budget reduces funds for this program to allow the USGS to focus on higher priority research activities.

Chronic Wasting Disease (-$1,250,000 / -2 FTE) – The budget reduces funds for this program to allow the USGS to focus on higher priority research activities.

Tick Management and Research (-$2,000,000 / -15 FTE) – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

Baseline Capacity - 2024 Fixed Costs (+$1,559,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $1,559,000 in the Biological Threats & Invasive Species Research Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

Biological threats, such as invasive species and wildlife disease endanger public health, agricultural resources such as livestock and crops, forests, other wildlife, and recreational opportunities like hunting and fishing. These threats negatively affect the economies and ecosystems in every State in the country, including both urban centers and wilderness areas. Recent studies have shown, for instance, that invasive species have been a contributing factor in over 30 percent of extinctions since the 1500s and economic costs of invasive species in the U.S. were estimated to be at least $1.22 trillion from 1960 through 2020[1]. Wildlife diseases can drive ecosystem change and have been identified by USFWS as stressors that can impact ESA listing decisions. For decades, USGS laboratories have provided aquatic and terrestrial wildlife health science that has informed natural resource management decisions for the United States and its territories. The Biological Threats and Invasive Species Research Program (BTISRP) develops decision-support tools and technologies to detect, monitor, assess risk, and control nationally significant invasive species and fish and wildlife diseases. Research and technology development focuses on species that have the potential to cause significant economic or ecological concerns. A strong emphasis of the program is technology transfer to management agencies.

After USGS operationalized surface water detection methods for infectious avian influenza virus, HPAI was detected in Iowa wetlands in 2022. Here, you can see a USGS hydrologist with a National Park Service veterinarian, surveying Constitution Gardens surface waters, Washington DC, for AIV and harmful algal toxin blooms. Source: USGS.

Biological Threats

Wildlife Disease: In 2023 (through November), the BTISRP's curated wildlife disease database reported 35 wild bird highly pathogenic avian influenza (HPAI) mortality events representing 35 species and over 8,350 birds, with bald eagles as the most frequently reported. To better understand how wild birds are encountering domestic poultry, USGS Global Positioning System (GPS) telemetry data confirmed that with the loss of natural wetlands and expansion of agricultural areas, dabbling ducks are moving from wetlands onto poultry operations, feedlots, and retention ponds in California and Washington State for food and water. The BTISRP also confirmed that the virus can be detected in wetlands and developed a method to find infectious HPAI in surface waters. The USGS is now working with USFWS to determine if water manipulation can limit the spread or persistence of HPAI in wetland surface waters.

Endangered black-footed ferrets and their prairie dog prey experience significant mortality due to the flea-borne sylvatic plague, which also can affect pets and people. BTISRP scientists developed mitigation tools, including a plague vaccine for prairie dogs and flea control with baits. Similarly, the BTISRP has developed a safe white-nose syndrome (WNS) vaccine for bats and is finalizing field assessment of efficacy, including fulfilling a USFWS request to vaccinate as many endangered northern long-eared bats

[1] Fantle-Lepczyk, J.E.; Haubrock, P.J.; Kramer, A.M.; Cuthbert, R.N.; Turbelin, A.J.; Crystal-Ornelas, R.; Diagne, C.; Courchamp, F. Economic costs of biological invasions in the United States. Sci. Total Environ. 2022, 806, 151318.

as possible to help curb WNS mortality. There are resilient populations of these species and USGS is investigating underlying mechanisms for this WNS resistance.

During FY 2025, the USGS will continue development of the Aquatic Disease and Pathogen Repository, which will include spatially referenced freshwater and marine aquatic pathogen and disease information for fin fishes, mollusks, and other aquatic animals. It will be similar to the USGS Nonindigenous Aquatic Species database (NAS) in structure and function and will integrate with the NAS to permit users to overlay data from other databases, such as the USGS Wildlife Health Information Sharing Partnership (WHISPers). This augmentation will further permit users to visualize patterns of aquatic pathogens (native or invasive) for understanding and predicting aquatic animal diseases.

Invasive Species

Invasive Carp: The BTISRP leads Federal research on early detection and development of removal methods and deterrents to reduce populations and prevent further spread of bighead, black, grass, and silver carp (invasive carps). In 2023, BTISRP released a 5-year invasive carp strategic framework that targeted research developed in concert with and vetted by partners, in seven thematic areas, including early detection and rapid response, decision support, baits and attractants, deterrents, genetic controls, pesticides, and removal methods. Recent accomplishments include improving the ability to assess behavior, density, and habitat use of bighead carps in sensitive areas and habitats by using semiautonomous GPS-enabled kayaks and low-cost recreational-grade sonar systems. USGS scientists continue to use carbon dioxide in addition to other technologies to deter movement of invasive carp to management applications, working to incorporate carbon dioxide into other deterrent technologies (e.g., as in plans outlined by the Tennessee Valley Authority Programmatic Environmental Assessment and at the USACE Brandon Road Lock), and providing supportive research that can improve the efficiency or cost associated with these management tools. The BTISRP will soon complete a "deterrents playbook" for invasive carp that provides a roadmap for managers to help them decide where and when to use underwater acoustic deterrent systems to deter movements of invasive carp. In addition, the BTISRP continued research that is required for registration of the fish pesticide Piscamycin and provided field training to Interior partners for applying the formulation.

The USGS collaboratively works with partners to develop, evaluate, and transfer research findings and technology to resource agencies in the fight against invasive carp. (Images shown left-right clockwise) Scientists work with partners to repair Underwater Acoustic Deterrent System (UADS) on the Upper Mississippi River; capture, tag and monitor 40 pound invasive bighead carp (center) and native lake sturgeon (upper right) as part of the UADS evaluation on the Upper Mississippi River; and capture, tag and monitor silver carp movement as part of the multi-agency fish passage project to inform decisions on future deterrent placement on the Tennessee-Cumberland Rivers in Kentucky. Source: USGS.

Terrestrial Invasive Species: The BTISRP has increased capacity for research addressing adapting terrestrial invasive species management methods to a changing climate. For example, changes in the timing of cheatgrass growth from year to year makes it difficult for managers to plan control treatments for this landscape-altering invasive grass. The USGS deployed an array of timelapse cameras and developed predictive models to identify how daylength, temperature, and precipitation influence cheatgrass green-up and die-off. In collaboration with the NPS and other partners, BTISRP scientists are developing tools that use satellite imagery and other remotely sensed data to inform strategies that address the emerging threat of cheatgrass and other invasive plants in the Greater Yellowstone Ecosystem due to earlier snowmelt and warmer spring temperatures. In Hawai'i, the BTISRP is evaluating the intersection of terrestrial biological invasions and climate projections to help partners prioritize fence placement to exclude predators and other biological refuge strategies for threatened and endangered species in the rare dry tropical ecosystem at the Nāpu'u forest reserve.

USGS scientist deploying timelapse cameras across a range of elevations and latitudes to capture variation in cheatgrass growth and die-off timing. Source: USGS.

USGS Nonindigenous Aquatic Species (NAS) Database: The USGS Nonindigenous Aquatic Species database is the central source for aquatic invasive species data needs for the Federal government, natural resource managers, researchers, decision-makers, and the public. Citizen scientists are also able to report suspected sightings for verification by experts. The database tracks the occurrence of 1,400 freshwater and marine fishes, invertebrates, mammals, reptiles, amphibians, and plants in the U.S and its territories. NAS data dates to the 1700s with specimen records from museums, Tribes, Federal, and State agencies, academic researchers, literature, and other databases. An automated email alert system informs over 1,100 users immediately when a species or collection location is added to the NAS. In FY 2023, the NAS database added almost 13,000 records, bringing the total to 709,165. There were 560,251 database visits and 1.33 million page views. A major recent addition to the NAS database was the inclusion of environmental DNA (eDNA), which enables detections of aquatic invasive species and allows for improved early detection of potential new invasive species or expansions of existing species.

Early Detection and Rapid Response (EDRR): The BIL funding continues to provide an opportunity to advance coordinated invasive species management efforts that will have meaningful impacts across the Nation. One of the Interior's keystone initiatives is to advance a National Early Detection and Rapid Response (EDRR) Framework to find and eradicate invasive species new to the U.S. or those demonstrating secondary spread by coordinating across Federal and non-Federal partners and investing in innovative approaches for use by resource managers. These steps include horizon scanning technologies to identify species and pathways that present the greatest risk to the United States; invasion hotspot

Illustration of how the cadre of projects that make up the institutional architecture behind the National Early Detection Rapid Response Framework contribute to the four stages of EDRR: planning (identifying species to surveil and areas to monitor), detection (whether using traditional, molecular, or remotely sensed data), reporting of results to online databases, and responding to new occurrences of high impact invasive species with teams of technicians and other responders. Source: USGS.

analyses to identify areas most likely to be invaded; the deployment of genetic and traditional sampling tools to detect invading organisms at the earliest point possible; and interjurisdictional response processes to quickly eradicate new invaders. The National EDRR Framework brings together these activities and establishes processes across Interior bureaus to accomplish coordinated transformative outcomes that may not otherwise be achieved.

In FY 2022, the USGS received BIL funding for an initial set of projects to develop decision support and early detection tools that bureaus will begin to operationalize across Interior-managed lands and assets starting in FY 2024 and continuing through FY 2026. BIL and base program investments in these tasks have been essential to help institutionalize and ensure the long-term sustainability of the National EDRR Framework.

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Ecosystems
Cooperative Research Units Program

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Cooperative Research Units Program	**28,206**	**28,206**	**+672**	**0**	**+895**	**29,773**	**+1,567**
Brown Bullhead Research	[250]	[250]	[0]	[0]	-250	[0]	[-250]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,145	[1,145]	[+1,145]
FTE	***155***	***155***	***0***	***0***	***+0***	***155***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the Cooperative Research Units Program is $29,773,000 and 155 FTE, a program change of +$895,000 and +0 FTE from the 2024 CR.

Brown Bullhead Research (-$250,000 / -0 FTE) – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

Baseline Capacity - 2024 Fixed Costs (+$1,145,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $1,145,000 in the Cooperative Research Units Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

The Cooperative Research Units Program (CRU) is a unique cooperative relationship between the USGS, the USFWS, State fish and wildlife agencies, host universities, and the Wildlife Management Institute, a non-profit that works to improve the professional foundation of wildlife management. Following the original legislation that created the CRU Program (Public Law 86–686), all research priorities are set locally at each unit in consultation with these Federal and State cooperators (known collectively as the Coordinating Committee). The individual resources of each cooperator are leveraged to deliver program outcomes that far exceed what any one cooperator could achieve alone.

The goals of the CRU Program are to sustain and maintain:

- A cost-effective, national network of Federal, State, and university partnerships pursuant to the Cooperative Research and Training Units Act of 1960 (P.L. 86-686), with a legislated mission of research, education, and technical assistance focused on fish, wildlife, ecology, and natural resources.
- A customer-oriented network of expertise for actionable science, research, teaching, and technical assistance that is responsive to the information needs of State and Federal resource agency decision makers.
- Science capabilities responsive to resource management needs of Interior bureaus.
- A premier program for graduate education, mentoring, and training of future natural resources professionals from diverse backgrounds to learn skills to serve the broad natural resource management community successfully.

List of cooperators the CRU program partners with for research, both internal and external partners. Source: USGS.

The CRU Program is currently composed of 43 cooperative units located at universities in 41 States. The Program is designed to leverage cooperative partnerships with Federal and State agencies to address mutual needs of all partners in a cost-effective manner. Through the CRU Program, the USGS stations Federal scientists at universities to help identify and respond to natural resource information needs through pooling of resources among agencies; participate in advanced scientific training and mentoring of university graduate students to represent the various agencies workforce of the future; and provide Federal and other natural resource managers access to university expertise and facilities. Federal support of the CRU Program is augmented by State and university cooperator contributions of expertise, equipment, facilities, and project funding, thereby enhancing the program's cost effectiveness. CRU Program funding continues to be leveraged by Federal, State, university, and other entities' contributions at a ratio of three matching dollars to each appropriated dollar. Through university affiliations, CRU scientists train a diverse group of future natural resource professionals and provide opportunities through graduate education to diversify the Federal workforce.

Each CRU is directed by a Coordinating Committee that establishes goals and expectations for its unit within the program's mission of research, education, and technical assistance. The mix of priorities is established locally and is updated annually based on the needs of cooperators and available funding. Program accountability measures and standards, and oversight of Federal scientists are used to ensure research and the resulting scientific information products support the goals of the USGS and the Interior.

Ecosystems
Ecosystem Change Research Program

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Land Change Science (OLD)	**20,066**	**20,066**	**+0**	**-20,066**	**+0**	**0**	**-20,066**
Transfer to Ecosystems Change Research Program	[20,066]	[20,066]	0	-20,066	+0	[0]	[+0]
FTE	***109***	***109***	***0***	***-109***	***+0***	***0***	***-109***
Ecosystems Change Research Program (NEW)	**0**	**0**	**+464**	**+20,066**	**+1,651**	**22,181**	**+22,181**
Transfer from Land Change Science Program	[0]	[0]	[0]	+20,066	+0	[20,066]	[+20,066]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,651	[1,651]	[+1,651]
FTE	***0***	***0***	***0***	***+109***	***+0***	***109***	***+109***

Justification of 2025 Program Changes

The 2025 budget request for the Ecosystem Change Research Program is $22,181,000 and 109 FTE, a program change of +$1,651,000 and +0 FTE from the 2024 CR.

Baseline Capacity - 2024 Fixed Costs (+$1,651,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $1,651,000 for the Ecosystem Change Research Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

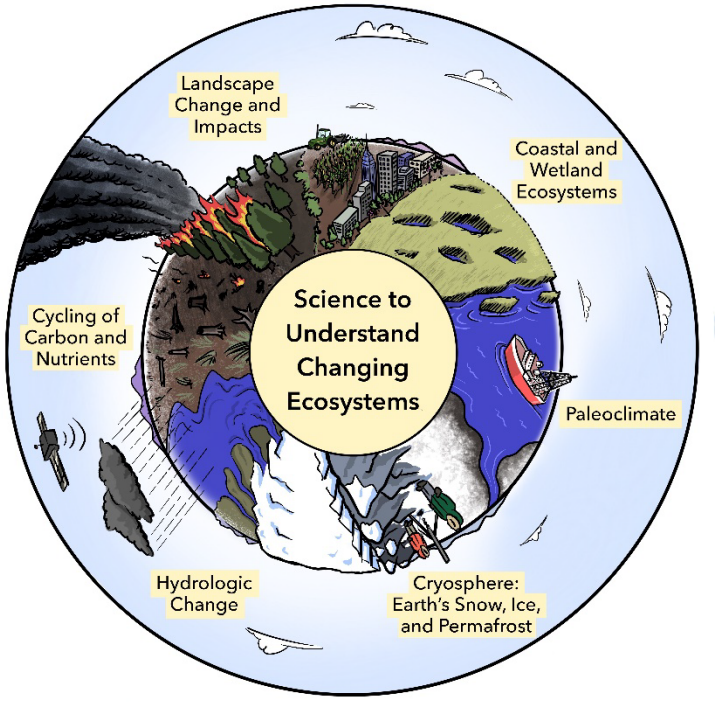
Program Overview

Healthy ecosystems are of vital importance to thriving U.S. communities and the economy. Changes in the environment, land use, and climate can have significant impacts on ecosystem health and resilience, which then impacts the Nation's economy, natural resources, and infrastructure, as well as water, food, and energy security. The Ecosystem Change Research Program (ECRP) excels in interdisciplinary and integrated scientific research that is focused on understanding patterns, processes, and impacts (past, present, and future) of seasonal weather patterns, environment, and land use. Research conducted by the ECRP provides scientific data to improve projections of change under different management scenarios

and strengthen the Nation's ability to respond, mitigate, and adapt to stressors. The science is used by many stakeholders including resource managers at the Federal, State, and local level, Tribal partners, and other research partners.

The current research foci of the ECRP are:

- Understanding the impacts of environmental extremes and disturbance on ecosystem processes and services, including impacts of drought, fires, land use change, sea level rise, and flooding on many natural resources including forests, rangelands, freshwater resources, glaciers, permafrost, urban areas, and coastal ecosystems.
- Researching and modeling the impacts of environmental, land, and severe weather pattern changes to better understand ecosystem robustness and ways in which nature can help buffer human communities from natural hazards.
- Understanding past climate using paleoecology approaches and using this knowledge to inform and improve models of future severe weather events and their impacts.



Science to Understand a Changing World: The Ecosystem Change Research Program studies the changes that occur in ecosystems, determining how, why, where, and what causes ecosystem change and what impacts those changes have on the function and resilience of ecosystems. This information can also be used to predict anticipated future ecosystem changes and impacts. Source: USGS.

ECRP research integrates USGS expertise in past climate, geology, hydrology, geography, and biology to examine changes from daily to millennial timescales, and to assess and model impacts of change on local, regional, and national scales. Understanding how the threats of land use change and environmental change are impacting or will impact ecosystems is key to protecting and restoring ecosystems so that they can keep providing the important services on which humans depend, including clean and adequate water and resilience to fire, floods, and drought.

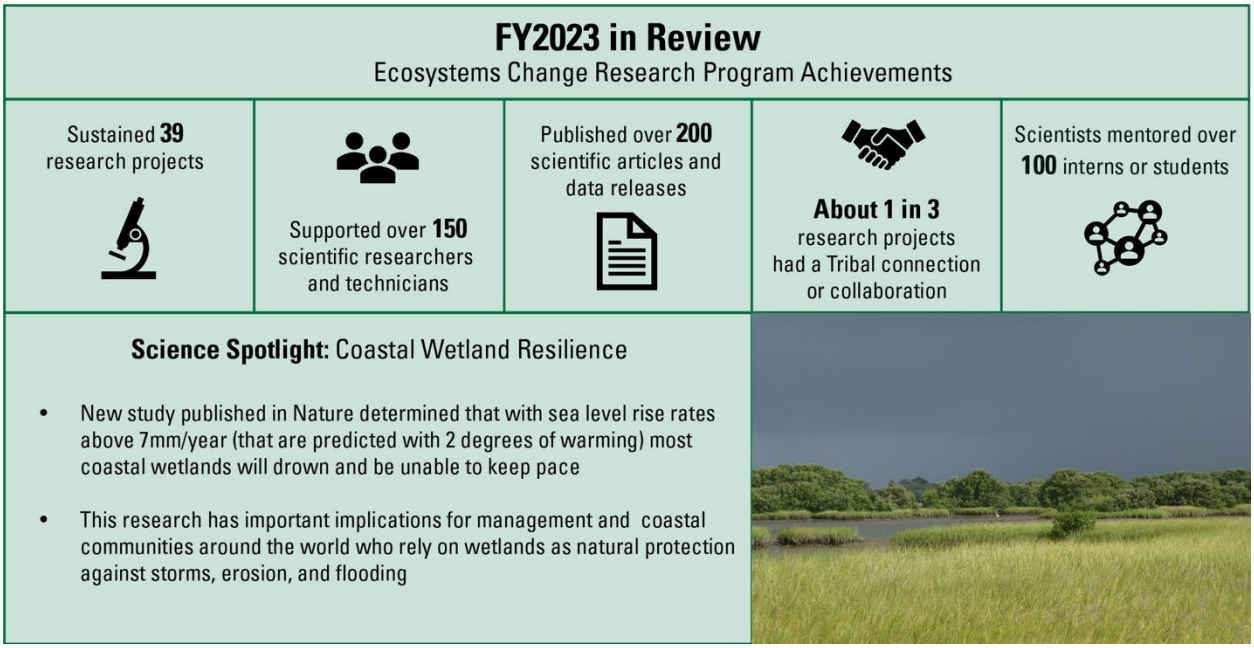
There are several characteristics that make the ECRP unique:

1) Projects are funded in 5-year cycles. This allows scientists to develop a deeper knowledge of their research ecosystems and ask more complex questions that require longer time scales of study. In addition, scientists can develop long-term data archives at their specific sites, which can be leveraged by scientists across the country. These deep, site-specific research and data archives are also a rich resource for land managers when they are faced with challenging, complex management decisions and have specific questions that can be addressed with longer-term data. For example, scientists in the program are providing land managers at the NPS, USFWS, and

BLM with specific information on matters such as: forest management considerations after major wildfires, including informing tree seed planting decisions; whether there are effective strategies to maintain coastal wetland surface elevations and resilience; and how long-term and severe drought conditions impact grasslands which are critical for sustaining rangelands for livestock. By maintaining such long-term data strategies, land managers have comprehensive data that they can depend on when making critical management decisions.

2) Program scientists have time to develop new research methods, some of which become standard practice for scientists around the globe (i.e., Surface Elevation Tables which are the global standard for measuring change in coastal wetland surface elevation to evaluate if coastal wetlands are keeping pace with coastal flooding or at risk of inundation);
3) The ECRP has one of the largest groups of paleoecology scientists in the U.S. This enables the USGS to gather data on Earth's environmental conditions before instrumental records began, which provides the necessary "big picture" context for the severe weather patterns, such as drought, flooding, and hurricanes being observed today. Paleoscientists in the ECRP are developing new methods for data collection, completing large-scale synthesis efforts, and making substantial contributions to collecting past weather data necessary to test USGS models, find areas that need improving, and therefore make predictions of future environmental conditions more accurate.

With the help of partners from around the world, the ECRP conducts research on the impacts of threats such as drought, flooding, wildfire, or severe weather on ecosystem health and resilience. This research is carried out in many ecosystems including wetlands, tundra and sea ice, rangelands, forests, drylands, freshwater, coastal and marine systems, and mountain ecosystems, as well as some urban areas across North America. The ECRP supports some of the longest records of annual measurements of ecosystem change in North America, including for several glaciers and national parks. This research provides the scientific basis for land use decisions that affect the safety and prosperity of human communities and the Nation's natural resources.



The ECRP conducts research in a variety of settings and for a range of applications. Some recent examples of this work include:

- ECRP paleoscientists put together the North American Tree-Ring Fire Scar Network using all known fire-scar data in the U.S., creating a database of hundreds of years of fire history, weather, and land use patterns to inform present day land managers. These data, together with indigenous knowledge, have led to the finding that forests in the Southwest U.S. used to experience more cultural burning and, as a result, forests historically were more resilient to extreme wildfires.

Recent ECRP work wove together paleoecology data from the North American Tree-Ring Fire Scar Network with Indigenous Knowledge of the Navajo, Jemez, and Apachería Cultures to understand how cultural Indigenous fire management practices historically kept Southwest U.S. Forest biomass lower and more resilient to wildfires. Source: USGS.

- For over two decades, a project in Rocky Mountain National Park (ROMO) has gathered data to understand both the background natural variability of the alpine lake ecosystems and to understand the impacts of human-caused nitrogen pollution. This research, undertaken at the request of ROMO, has become the foundation of a joint effort with the State of Colorado, the agricultural industry, other Federal agencies, and the ECRP to develop and implement a voluntary nitrogen reduction plan in the State in order to protect the iconic beauty and health of ROMO. The pollution reduction plan will also benefit the region's agriculture and forestry industries via reduced pollution, as well as improving human health conditions by reducing air pollution across the region.

A decades long partnership, investigating water quality and ecosystem health in Loch Vale, ROMO has led to invaluable data and insights in nitrogen cycling and ecological processes. The long-term data and evidence led the State of Colorado and partners to create a voluntary nitrogen reduction plan to help protect the beauty and health of ROMO with additional benefits to regional agriculture, forestry, and local air quality. Source: USGS.

- Program paleoscientists are developing novel techniques to collect data in new environments. For example, ECRP scientists have developed a new method for investigating past oceanic conditions which have been hard to study except in tropical regions where corals can be sampled. A new method using shells of long-lived quahog clams, which live in colder water, is allowing scientists to examine past oceanic conditions in the mid- and upper Atlantic Ocean. Clams, a key cultural and economic resource, are long-lived species and their shells contain annual banding just like tree rings which allows scientists to look many centuries into the past to understand changing environmental conditions year-by-year. This research is helping to support the growing shellfish industry in the southeastern U.S. and Gulf of Mexico which relies on the quahog clams. The new data from this project will aid resource managers and industry stakeholders in shellfish production.
- A project focused on mitigation and adaptation activities is underway with the City of Denver, where program scientists are working with city managers to measure the impacts of trees on urban heat and to help plan where Denver can make investments in tree planting that will improve equitable access to green infrastructure and provide the most benefit to residents.
- A healthy soils project is focused on helping rural communities with critical science to support local agriculture, human health, recreation, and wildlife. Recent severe droughts are impacting the ability of soils to support ranching and agriculture. The ECRP is working with ranchers, the BLM, NPS, counties, and cities to co-produce actionable science using cutting edge chemical, mapping, and Artificial Intelligence (AI) approaches that map and forecast soil health and help inform land manager decisions in grasslands, shrublands, and pinyon-juniper dryland forests. Outreach and education efforts are a significant part of this project to ensure that the local communities and stakeholders benefit from this effort.

ECRP scientists are working with rural landowners to study the effects of drought on Western rangelands. The work is examining the long-term effects of drought and land use on ecosystems health and resilience as well as soil health and fertility. Source: USGS.

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Ecosystems
National and Regional Climate Adaptation Science Centers

Ecosystems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Climate Adaptation Science Centers (OLD)	**63,115**	**63,115**	**+0**	**-63,115**	**+0**	**0**	**-63,115**
Transfer to National and Regional Climate Adaptation Science Centers	[63,115]	[63,115]	[0]	-63,115	+0	[0]	[+0]
FTE	***105***	***105***	***0***	***-105***	***+0***	***0***	***-105***
National and Regional Climate Adaptation Science Centers (NEW)	**0**	**0**	**+464**	**+63,115**	**+5,721**	**69,300**	**+69,300**
Support for Climate Adaptation Science Centers	[42,335]	[42,335]	[0]	[0]	+3,000	[45,335]	[+45,335]
Coordinating Federal Capacity to Build Climate Resilience	[0]	[0]	[0]	[0]	+1,000	[1,000]	[+1,000]
USGCRP/National Nature Assessment	[400]	[400]	[0]	[0]	+1,000	[1,400]	[+1,400]
Transfer from National and Regional Climate Adaptation Science Centers	[0]	[0]	[0]	+63,115	+0	[63,115]	[+63,115]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+721	[721]	[+721]
FTE	***0***	***0***	***0***	***+105***	***+3***	***108***	***+108***

Justification of 2025 Program Changes

The 2025 budget request for the National and Regional Climate Adaptation Science Centers is $69,300,000 and 108 FTE, a program change of +$5,721,000 and +3 FTE from the 2024 CR.

Support for Climate Adaptation Science Centers (+$3,000,000 / +0 FTE) – With this increase, the USGS would expand the work conducted by the network of university-based Climate Adaptation Science Centers (CASCs). The effort would work to understand the effectiveness of methods resource managers are using on the ground to adapt to changing environments and conditions and would support the science needs identified in the Department of the Interior Climate Action Plan. Specifically, the USGS would develop new scientific approaches to understand adaptation effectiveness such as the Resist, Direct, and Adapt framework and other

approaches to adaptation that will allow the USGS to improve and provide a larger suite of the actionable science natural resource managers need to adapt to future environmental change. Once completed, these scientific efforts would ensure management agencies could integrate the best available science into adaptation planning efforts.

Coordinating Federal Capacity to Build Climate Resilience (+$1,000,000/+1 FTE) – In coordination with other Federal agencies that provide climate services and with the U.S. Global Change Research Program, the USGS will improve the accessibility, discoverability, and use of state-of-the-art technical capabilities to assess, plan for, and respond to climate change and associated impacts. This work would support local, State, Tribal, Territorial, and Insular Area governments, while also serving Interior bureaus and other Federal agencies. It will lead to greater consideration of future climate conditions in planning scenarios and reduce future climate risk.

The USGS would accomplish these objectives by augmenting existing and co-developing new technical tools and resources, such as a coordinated inventory of science and information housed across Federal agencies, and by adding technical capacity to rapidly assist partners to access, use, and interpret this science and data. The USGS will coordinate this additional capacity with the current technical assistance and climate services capabilities at other Federal agencies. This will increase the accessibility and uptake of publicly available climate services, reduce the burden to users trying to access this information, and result in projects that protect personnel, property, and mission operations from impacts related to severe weather events.

United States Global Change Research Program (USGCRP)/National Nature Assessment (+$1,000,000 / +2 FTE) – The USGS and Interior are providing technical support to help assess the status of nature across the U.S. The National Nature Assessment (NNA) is the first comprehensive attempt to assess, across the U.S., the current state of nature, to understand the future of nature and to identify approaches to adaptation and mitigation. Work under this initiative is being closely coordinated with other administration priorities such as the Natural Capital Accounting effort and the Conservation and Stewardship Atlas attached to the America the Beautiful initiative. The funding would be used for data and information management support, to further develop online tools and accessibility to Federal environmental data, and to provide products that can directly support adaptation efforts in natural resource management.

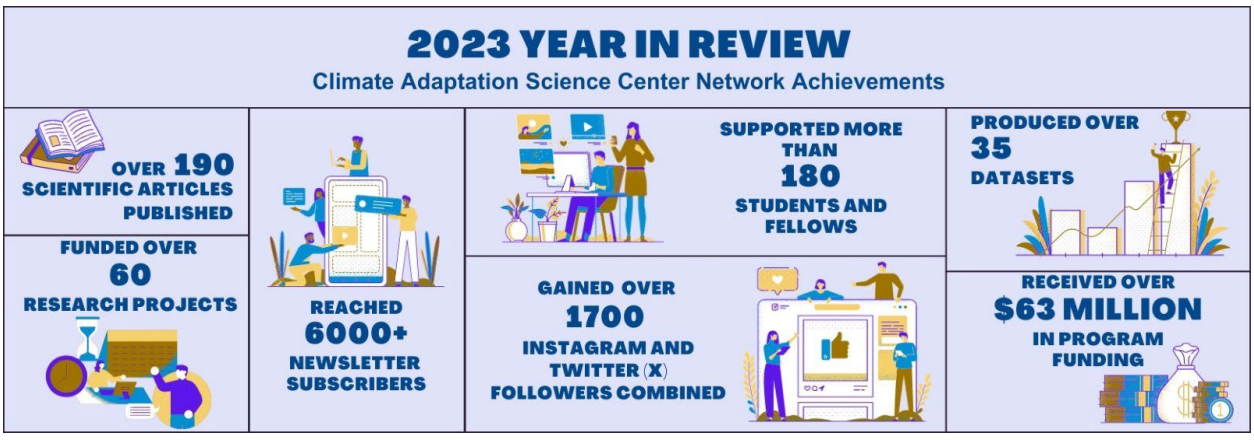
Baseline Capacity - 2024 Fixed Costs (+$721,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $721,000 for the National and Regional Climate Adaptation Science Centers which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

The National and Regional Climate Adaptation Science Centers (NRCASC) were established to fill an unmet need of providing scientific information, tools, and techniques to natural and cultural resource managers and communities who are working to adapt to a changing climate and other stressors. The NRCASC develops science to help resource managers address the impacts of climate change on fish, wildlife, ecosystems, and the communities they support. The network is comprised of a National CASC and nine Regional CASCs covering the continental U.S., Alaska, Hawai'i, the U.S.-Affiliated Pacific Islands, Puerto Rico, and the U.S. Virgin Islands. Regional CASCs serve the unique climate needs of the States within their footprint. Each Regional CASC is based out of a host university in their region and is comprised of multi-institution consortia including university, Tribal, and non-governmental partners.

The USGS's expertise in scientific partnership together with the strength of the NRCASC's consortium allows the network to bring the best science and technical assistance to bear on the challenges of adapting to a changing climate. NRCASC collaborates with managers and scientists from State and Federal agencies, Tribal and Indigenous communities, universities, and non-governmental organizations to address science needs and inform adaptation planning. The NRCASC network emphasizes generating actionable science that address identified needs and directly supports resource management decisions. It works with users and partners to identify priority issues, develop research plans, produce useful products, and guide implementation. NRCASC science products are accessible to on-the-ground users through data management, science synthesis, and science translation efforts.

The NRCASC network serves as an Interior asset for the Federal community of resource managers and the greater public. The NRCASC produces and translates science for these managers to help them anticipate, plan for, and adapt to a changing environment. The network integrates best practices and evaluates the actionability of its science to further advance climate-informed decision-making and bridge the gap between science and management. The NRCASC works collaboratively with scientific expertise found throughout the USGS EMA and in other USGS programs, along with scientific expertise available among external partners.



This graphic shows the 2023 productivity and achievements summary for the Climate Adaptation Science Network. Source: USGS.

The NRCASC's portfolio includes research on the highest priorities of the Interior such as wildfires, wildlife disease, invasive species, drought, climate effects on Federally listed species or critical habitat, recreational fisheries, permafrost thaw, and Tribal lands and waters. The 2023 - 2028 science objectives of the NRCASC network include:

Contributing to the essential knowledge of physical changes in the air, water, and on land.

- Improving our knowledge of climate change and variability, particularly as related to management of natural and cultural resources.
- Assessing the hydrological implications of climate change, including improving understanding of changes to drought, flooding, sea-level rise, and the cryosphere.
- Understand the effects of climate change on the frequency, severity, intensity, and extent of disturbance regimes, such as wildfires, pests, pathogens, and land use change.
- Further refining climate-driven response models to address data scarcity, uncertainty, and other limitations of predictive modeling.

Assessing the impacts of climate change on fish, wildlife, habitat, ecosystem services, and cultural resources.

- Investing in developing a better understanding of how high priority species, communities, and ecosystems respond to climate change.
- Focusing resources on understanding the impacts of changing climate on inter-specific and community dynamics and the vulnerabilities of native species and ecosystems.
- Conducting research on transformations within the structure, function, processes, and services of ecological communities and systems.

Accelerating research on adaptation strategies.

- Advancing science to design and test the efficacy of adaptation strategies.
- Evaluating and developing methods to monitor the effectiveness of adaptation strategies.
- Conducting research to identify refugia, corridors, and habitats to support adaptation of fish and wildlife.
- Providing information on species' adaptive capacity to climate change and help incorporate into species management plans.
- Developing decision tools for climate adaptation that inform managers of risks, benefits, effectiveness, and related considerations.

Energy and Mineral Resources

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Energy and Mineral Resources

Energy and Mineral Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Energy Resources Program	**33,365**	**33,365**	**+659**	**0**	**+5,467**	**39,491**	**+6,126**
FTE	***127***	***127***	***0***	***0***	***+7***	***134***	***+7***
Mineral Resources Program	**70,855**	**70,855**	**+1,582**	**0**	**+8,405**	**80,842**	**+9,987**
FTE	***260***	***260***	***0***	***0***	***+11***	***271***	***+11***
Energy and Mineral Resources Total	**104,220**	**104,220**	**+2,241**	**0**	**+13,872**	**120,333**	**+16,113**
FTE	***387***	***387***	***0***	***0***	***+18***	***405***	***+18***

The 2025 budget request for the Energy and Mineral Resources Mission Area is $120,333,000 and 405 FTE, a program change of +$13,872,000 and a +18 FTE from the 2024 CR.

Mission Area Overview

The Nation relies on a variety of energy and mineral resources to power homes and businesses and to manufacture products and technologies, from phones to vehicles. Understanding its resources and their potential in the global economy has become increasingly important, as recently demonstrated by the impacts of the COVID-19 pandemic on supply chains. The USGS Energy and Mineral Resources Mission Area (EMMA) is the Nation's primary source of impartial scientific information on domestic and global geologic resources and their supply chains. The USGS maps and conducts research on both traditional geologic resources and emerging resources, including critical minerals essential to the energy transition, and the potential for geologic storage of energy and of carbon dioxide. USGS research includes the full life cycle of these resources: geologic resource occurrence, extraction, use, and disposal. In addition, the USGS studies the effects of these life cycle stages on other resources, such as resource extraction requirements for water supply and the potential for reuse of energy and mine wastes. USGS energy and mineral resources research and global mineral supply chain analyses inform sustainable natural resource management; economic, technological, national security, and global trade strategies and investments; and the development of infrastructure.

Resource Assessments: The USGS is the primary provider of unbiased, publicly available assessments of geologic resources for the United States and globally. These assessments describe the potential for undiscovered conventional geologic resources, including minerals; oil; natural gas; coal; and uranium. In addition, the USGS assesses renewable and unconventional resources, including geothermal resources for energy, heating, and cooling; gas hydrates; hydrogen; and helium; and the potential to store energy and wastes in the subsurface, including the potential for carbon capture, utilization, and storage. USGS

assessments also characterize the environmental impacts of and constraints on resource extraction, such as the quality and quantity of water and wastes associated with development. As authorized by the Energy Act of 2020, the USGS is developing assessments of resources in energy waste and mine waste to help decision-makers evaluate the potential to reprocess critical minerals as part of reclaiming waste sites. The Bureau of Land Management's (BLM) energy lease sales and state resource management plans depend on USGS domestic assessments of resource potential, while USGS global assessments are used by Federal trade and foreign investment agencies to identify potential international trade partners.

Science to Inform Decisions: USGS energy and minerals research and supply chain analysis informs resource management decisions by Federal and state land managers, and billions of dollars in Federal and private-sector investments. For example, recent USGS research has stimulated new interagency efforts through the Federal Mining Dialogue mine waste management community to reprocess mine wastes for minerals critical to the energy technology transition. Recent USGS research has also identified opportunities to use geologic formations and mine wastes for carbon dioxide injection and mineralization, supporting BLM's response to the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act. The USGS provides technical assistance supporting BLM's development of reasonably foreseeable development scenarios and estimates of emissions associated with energy leases and carbon sequestration on Federal lands.

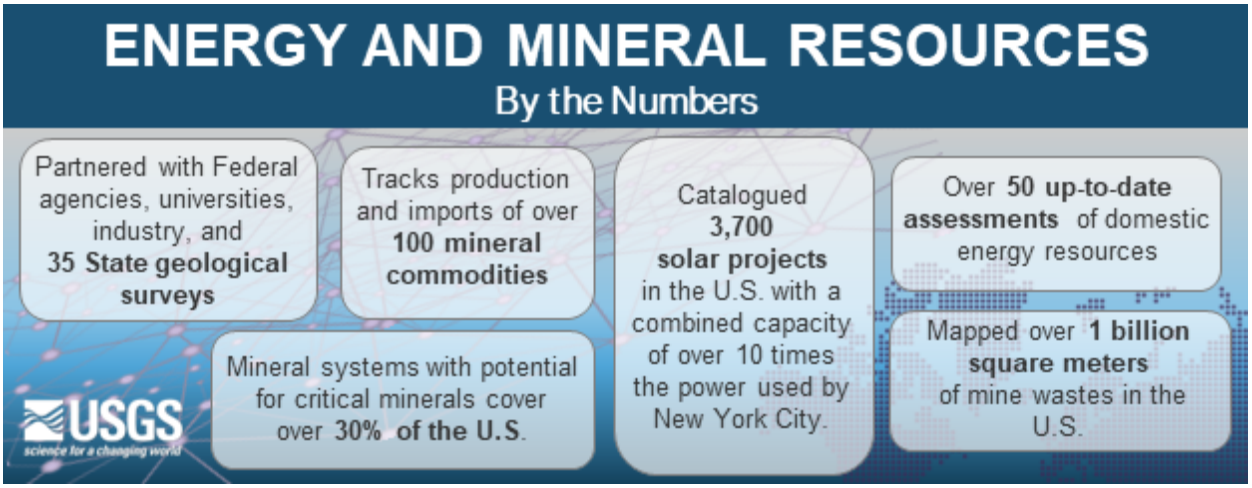
In addition, USGS mineral supply chain analysis is used to guide Federal decisions and investments in every aspect of the supply chain. The USGS provides extensive data and decision support to the Department of Defense for management of the National Defense Stockpile and use of Defense Production Act authorities to invest in domestic rare earth element and battery mineral supply chains; to the Department of Energy's loan programs; to the Treasury Department supporting implementation of Inflation Reduction Act tax incentives supporting domestic critical mineral processing and electric vehicle markets; to foreign investment and credit agencies such as the U.S. International Development Finance Corporation and Export-Import Bank; and to trade negotiators in the Office of the U.S. Trade Representative and the Department of Commerce's International Trade Administration. State agencies, private sector minerals and manufacturing decision-makers, Wall Street market analysts, and foreign trade partners similarly rely on USGS data and analysis.

Producing and Delivering High Quality Data: The Earth Mapping Resources Initiative (Earth MRI) is collecting an unprecedented volume of foundational data to transform and modernize the Nation's mapping of the surface and subsurface. The USGS is also partnering with the Defense Advanced Research Projects Agency (DARPA) to apply artificial intelligence tools and techniques to streamline data synthesis workflows for resource assessments, an efficiency that has the potential to significantly accelerate the delivery of critical mineral assessments as called for in the Energy Act of 2020. At the same time, the USGS is investing in data rescue, data quality, data management, and data delivery to ensure seamless public access to the results of both historic and ongoing large-scale data collection and interpretation. As an example, the Mission Area has implemented a laboratory quality management system, and the corresponding policies and procedures, that instill strong internal controls in its laboratories. As a part of this system, laboratories complete rigorous external audits that further ensure data quality. The Nation has invested heavily in the initial acquisition of these scientific resources and the USGS is making these data and unique historical assets FAIR (Findable, Accessible, Interoperable, and Reusable).

As authorized in the BIL, the USGS is also leveraging these new data assets, historical data, and data rescue efforts to support Interior in prioritizing legacy energy and mineral production sites for

remediation. One example is the oil and gas wells database first developed for Energy Resources Program (ERP) work on the Greenhouse Gas Emissions and Sequestration Inventory for Federal Lands, and extensions of that work to support Interior's Federal Orphaned Wells Program in inventorying, prioritizing, and plugging orphaned wells. Another example is the U.S. Mineral Deposit (USMIN) database first developed by the Mineral Resources Program (MRP) in collaboration with the BLM as the authoritative database of historical and present-day mining sites, which is now supporting Interior's development of an abandoned hard-rock mine reclamation program.

Geoscience Workforce: The USGS is investing significantly in rebuilding its own and the Nation's geoscience workforce. This workforce is essential to address future challenges posed by the energy transition and the economy's vulnerability to mineral supply chain weaknesses. ERP and MRP are providing technical assistance to sister agencies, States, and universities in their efforts to rebuild and update expertise in every aspect of the energy and mineral life cycles, from the evolution of energy resources and ore deposits through extraction and processing to waste management. The ERP is creating opportunities for early career professionals to identify and assess energy resources of the future and is leveraging recent graduates' expertise in artificial intelligence, machine learning, and data science to bring new techniques to advance flagship energy resource assessments. In response to the Energy Act of 2020 section 7002(k)(2-3), the MRP recently sponsored a National Academies of Science, Engineering, and Medicine workshop to identify critical gaps in undergraduate and graduate education and research leading to advanced degrees and a competitive workforce able to advance the Nation's capacity in the minerals fields. In addition, the USGS offers continuing education courses and cross-disciplinary workshops for other Federal agencies and State Geological Surveys that inform the recovery of critical minerals from mine wastes, building skills and expanding a knowledgeable workforce that can advance the cutting edge of mineral resources research.



FY 2023 Selected Mission Area Accomplishments

- The MRP led a Federal effort to evaluate the potential to reprocess mine waste for critical minerals. The Program advanced the National Mine Waste Inventory significantly through: (1) the completion of the joint USGS/BLM USMIN Mineral Deposit Database | U.S. Geological Survey (usgs.gov) of current and historical mining locations in all 50 states and Puerto Rico; (2) Earth MRI-funded grants to State Geological Surveys to sample mine waste; and (3) launching a collaborative effort with BLM, the Bureau of Indian Affairs, National Park Service, Office of

Surface Mining Reclamation and Enforcement, U.S. Forest Service, and Environmental Protection Agency to identify pilot sites to extract minerals from waste while supporting reclamation, remediation, and restoration.

- Hydrogen has long been debated as a future element of energy production and storage, but conventional wisdom held that there was no significant volume of naturally occurring (geologic) hydrogen suited to such uses. ERP research has identified a potential domestic hydrogen resource, and in 2023, the ERP kicked off a geologic hydrogen consortium in partnership with the Colorado School of Mines and the National Science Foundation. This partnership, which currently includes eight industry partners, is an important step in advancing the Nation's understanding of geologic hydrogen resources.
- The ERP, in partnership with State Geological Surveys, refined the assessment of geologic carbon dioxide storage potential in the Illinois Basin (Illinois, Indiana, Kentucky, and Missouri). The assessment considers pressure limitations in estimating the amount of carbon dioxide that can be stored, improving the accuracy of estimates. The methodology provides a significant improvement over existing estimates.
- The MRP has published the first national map of areas with potential for the 50 minerals that USGS supply chain analysis deemed critical in the 2022 list of critical minerals. BIL funding has accelerated this USGS and State Geological Surveys partnership through Earth MRI. The map will be used to prioritize areas of the country for collection of data to better quantify the Nation's critical mineral resource base and is stimulating questions from states on potential future regional mineral economies.
- The ERP systematically improved geothermal resource assessment methodologies through advanced data science, new and improved data for the Great Basin (Nevada, Utah, California, Idaho, Oregon, Wyoming, Arizona), and use of machine learning strategies. Partners include the U.S. Department of Energy and the Great Basin Center for Geothermal Energy at the University of Nevada, Reno.
- The USGS, working with DARPA and other partners, has launched a series of prize challenges to accelerate critical mineral mapping and resource assessments through artificial intelligence/machine learning. This effort, Critical Mineral Assessments with AI Support (CriticalMAAS) will provide AI/ML tools that can be used by both specialists and the public for applications involving legacy documents and specialized datasets.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

Energy and Mineral Resources
Energy Resources Program

Energy and Mineral Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Energy Resources Program	**33,365**	**33,365**	**+659**	**0**	**+5,467**	**39,491**	**+6,126**
Inventory of Subsurface Storage Capacity	[755]	[755]	[0]	[0]	+1,875	[2,630]	[+1,875]
Geothermal Energy	[2,065]	[2,065]	[0]	[0]	+1,840	[3,905]	[+1,840]
Geologic Carbon Sequestration	[3,177]	[3,177]	[0]	[0]	+300	[3,477]	[+300]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,452	[1,452]	[+1,452]
FTE	***127***	***127***	***0***	***0***	***+7***	***134***	***+7***

Justification of 2025 Program Changes

The 2025 budget request for the Energy Resources Program (ERP) is $39,491,000 and 134 FTE, a program change of +$5,467,000 and a +7 FTE from the 2024 CR.

Inventory of Subsurface Storage Capacity (+$1,875,000 / +3 FTE) – At this funding level, the USGS would support a first-of-its-kind geologic characterization of subsurface pore spaces available for storage, which is essential to inform the management of extraction and injection practices of a wide variety of energy resources. Specifically, under the USE IT Act, the Bureau of Land Management is seeking science support to manage the subsurface storage of multiple energy resources and wastes, including waste waters associated with oil and gas development and carbon dioxide storage. This funding increase would support subsurface storage capacity assessments to inform decisions made by public and private stakeholders and aid policymakers and Tribal leaders in all geographic areas of the United States. It will help to prioritize locations to focus on studying long term storage safety, including the potential for seismicity from injection of fluids or carbon dioxide into the subsurface, and the potential for leakage. This funding would support cooperation with the Bureau of Land Management and State Geologic Surveys to provide critical science decision support tools to manage the subsurface storage of multiple energy resources and wastes. This work also contributes foundational science on geologic emissions sources and sinks, which directly supports efforts to inventory greenhouse gas emissions on Federal Lands. The initial focus of the subsurface inventory will be the Federal subsurface estate.

Geothermal Energy (+$1,840,000 / +3 FTE) – The USGS would conduct an updated and expanded national assessment of geothermal energy resources, as directed by P.L. 116-260, the Energy Act of 2020. Geothermal energy is a potential significant source of renewable electric power in the western United States. Recent research shows that with advances in exploration and development technologies, lower-temperature geothermal energy is a potential source of baseload

electric power, as well as district heating and cooling, for the entire country. This funding increase would support a new assessment quantifying the potential for geothermal resources across the U.S., including Alaska and Hawaii.

Geologic Carbon Sequestration (+$300,000 / +1 FTE) - With the requested increase, the USGS would build on existing collaborations with coal mine operators to develop strategies to reduce emissions or capture methane for energy production. The initial phase of this work has focused on an underground coal mine operation in southwestern Virginia. Additional funding will support expansion of the collaboration to other coal mining areas of the country, and interagency efforts to improve nationwide measurement and monitoring of greenhouse gas emissions.

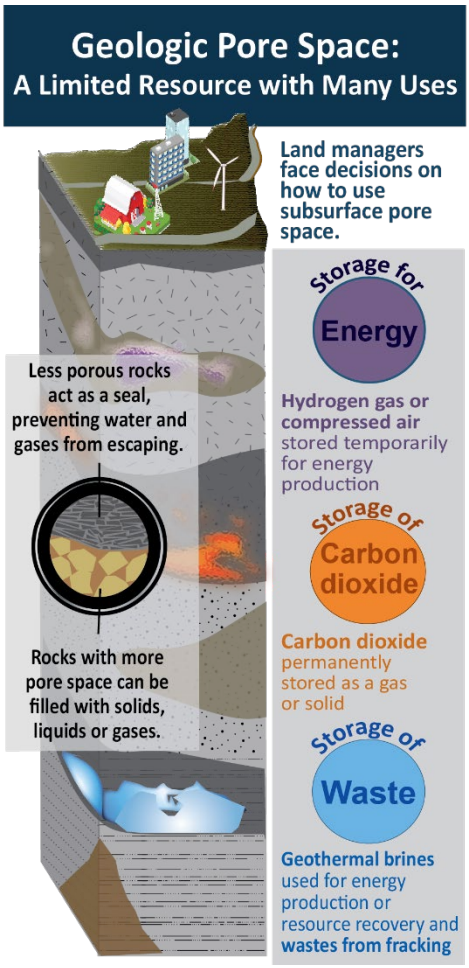
Baseline Capacity – 2024 Fixed Costs (**+$1,452,000 / +0 FTE**) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $1,452,000 in the Energy Resources Program which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

The Energy Resources Program (ERP) is the sole provider of unbiased, publicly available estimates of undiscovered, technically recoverable energy resources for the U.S. (exclusive of the U.S. Outer Continental Shelf). The USGS addresses the challenge of increasing demand for energy resources by conducting basic and applied research on geologic energy resources and the environmental and economic impacts of energy resource extraction and use. The Program also conducts research on related uses of the subsurface, including geologic carbon storage and energy storage. This USGS science informs strategic decision-making related to the Nation's reliance on domestic versus foreign resources and the management of energy resources and subsurface pore space on and under Federal and State lands. This information is critical in efforts to meet increased energy demands while simultaneously increasing the sustainability of energy development and ensuring energy security.

The Energy Resources Program's work supports the Energy Act of 2020, and the diversification and security of the U.S. energy portfolio.

Energy Resource Assessments and Methods Development: The USGS conducts assessments of many types of traditional, renewable, and emerging energy resources; the subsurface's storage capacity for carbon dioxide and other wastes; and the effects of energy development on other natural resources. The USGS's traditional energy resource assessments estimate the amount of undiscovered oil and gas resources that could be recovered using today's technologies. These assessments identify oil and gas resource potential across the United States and internationally in over 170 petroleum provinces. ERP's foundational geologic, geophysical, and geochemical studies provide information on resource potential as well as the environmental impacts of oil and gas development. These USGS resource assessments are used by a variety of stakeholders including local, Tribal, State, and Federal governments, other land



resource managers, the private sector, and the public. In 2024 and 2025, the USGS expects to complete close to a dozen energy resource assessments for significant basins in the United States and abroad.

The USGS also studies and quantifies the Nation's renewable and emerging energy resources, including geothermal energy, gas hydrates, and hydrogen. These resources have the potential to further diversify the U.S. energy portfolio. Geothermal resource assessments quantify traditional hydrothermal systems, enhanced geothermal systems and low temperature geothermal resources across the United States. USGS assessments of carbon dioxide, including the potential for carbon mineralization, and geologic energy storage potential provide critical information to support emissions management and renewable energy development. The USGS also works collaboratively with the U.S. Department of Energy to develop and maintain geospatial databases of renewable energy infrastructure, including wind turbines and large-scale solar farms and solar panels. Quantifying the Nation's renewable and emerging energy potential informs decision-making on the Nation's energy future and potential economic and environmental implications.

The USGS is also pioneering the development of tools and techniques to combine energy resource assessments with assessments of other co-located natural resources to quantify potential trade-offs in resource availability and use. Providing tools to quantify and model these trade-offs, such as the relationship between energy development and water quality and availability, will help natural resource managers balance development of interdependent resources and adapt to changing natural conditions, such as drought and fluxes in societal demand for energy and water resources.

Energy Resources Research: The USGS conducts research on a wide variety of energy resources, including coal, oil, gas, geothermal energy, energy gases such as carbon dioxide and hydrogen, and gas hydrates. This fundamental geologic research enables and accelerates the ERP's geology-based assessments.

The USGS' research addresses the full life cycle of energy resources from how and where resources form and accumulate prior to resource extraction by industry to reclamation, recycling, and disposal once extraction activities are complete. USGS research also informs the potential for resource recovery from energy wastes, such as lithium and other critical minerals in oil and gas and geothermal brines. A recent example is research demonstrating the potential for lithium recovery in the Smackover formation in Arkansas and Louisiana.

This research is used by a variety of decision-makers, including by industry to identify best practices to limit adverse environmental impacts, and by land use managers and regulators to enhance stewardship of public lands for multiple uses and for national energy and economic security. The USGS continues to invest in data delivery to ensure that energy resources research, assessments, and other information are

accessible to a variety of decision-makers. Products include the Geologic Carbon Sequestration interactive map, U.S. Wind Turbine Database, U.S. Large-Scale Solar Photovoltaic Database, National Produced Waters Geochemical Database, and National and Global Oil and Gas Assessment website.

Energy and Mineral Resources
Mineral Resources Program

Energy and Mineral Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Mineral Resources Program (OLD)	**70,855**	**70,855**	**+0**	**-70,855**	**+0**	**0**	**-70,855**
Transfer to National Minerals Information Center	[19,061]	[19,061]	[0]	-19,061	+0	[0]	[+0]
Transfer to Mineral Resources Research, Surveys and Assessments	[51,794]	[51,794]	[0]	-51,794	+0	[0]	[+0]
FTE	***260***	***260***	***0***	***-260***	***+0***	***0***	***-260***
Mineral Resources Program (NEW)	**0**	**0**	**+1,582**	**+70,855**	**+8,405**	**80,842**	**+80,842**
National Minerals Information Center	**0**	**0**	**+482**	**+19,061**	**+6,340**	**25,883**	**+25,883**
Critical Minerals Supply Chain Analysis and Forecasting	[0]	[0]	[0]	+2,865	+5,580	[8,445]	[+8,445]
Supply Chain Research for Emerging Technologies	[1,670]	[1,670]	[0]	-1,670	+0	[0]	[+0]
Critical Minerals – Forecasting	[1,195]	[1,195]	[0]	-1,195	+0	[0]	[+0]
Transfer from Mineral Resources Program	[0]	[0]	[0]	+19,061	+0	[19,061]	[+19,061]
Baseline Capacity – 2024 Fixed Costs	[0]	[0]	[0]	[0]	+760	[760]	[+760]
FTE	***0***	***0***	***0***	***+95***	***+11***	***106***	***+106***
Mineral Resources Research, Surveys, and Assessments	**0**	**0**	**+1,100**	**+51,794**	**+2,065**	**54,959**	**+54,959**
Transfer from Mineral Resources Program	[0]	[0]	[0]	+51,794	+0	[51,794]	[+51,794]
Baseline Capacity – 2024 Fixed Costs	[0]	[0]	[0]	[0]	+2,065	[2,065]	[+2,065]
FTE	***0***	***0***	***0***	***+165***	***+0***	***165***	***+165***

Justification of 2025 Program Changes

The 2025 budget request for the Mineral Resources Program (MRP) is $80,842,000 and 271 FTE, a program change of +$8,405,000 and +11 FTE from the 2024 CR.

Critical Minerals Supply Chain Analysis and Forecasting (+$5,580,000 / +11 FTE) - This funding level allows the USGS to continue critical mineral supply chain forecasting and scenario analysis, which informs billions of dollars in Federal and private sector investments and includes risk analysis methodologies for supply chain disruptions ranging from trade wars to natural disasters to electric vehicle market penetration. To date, these analyses are developed on-demand for specific decision makers. In accordance with the Energy Act of 2020, the USGS would invest in systems to provide earlier, and additional forecasts than currently exist, accelerating our ability to identify supply chain disruptions in advance of economic impacts and events ranging from earthquakes to pandemics. It would support projections of future critical minerals production, consumption, and recycling for key energy supply chains. This funding level would also support the USGS's intent to request that the Chief Statistician within the Office of Management and Budget designate the National Minerals Information Center as a Recognized Statistical Unit as described in 44 U.S.C. 3563. Such a designation would support the USGS commitment to delivering relevant, accurate, and objective mineral statistics and, under the Confidential Information Protection and Statistical Efficiency Act of 2018, would help ensure confidentiality of information acquired from the private sector and the public. For more information on this, please see the Proposed Budget Restructures section of the Executive Summary.

This change is also related to an internal transfer request in FY 2025. For more information on that request, please see the Justification of Internal Realignments section of the USGS Accounts chapter.

Baseline Capacity – 2024 Fixed Costs (+$2,825,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $2,825,000 in the Mineral Resources Program which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

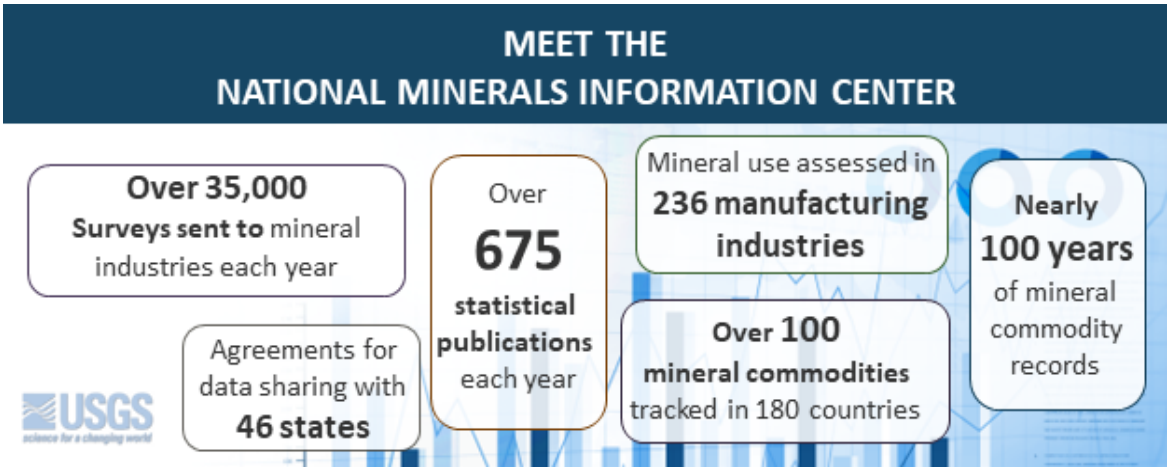
Program Overview

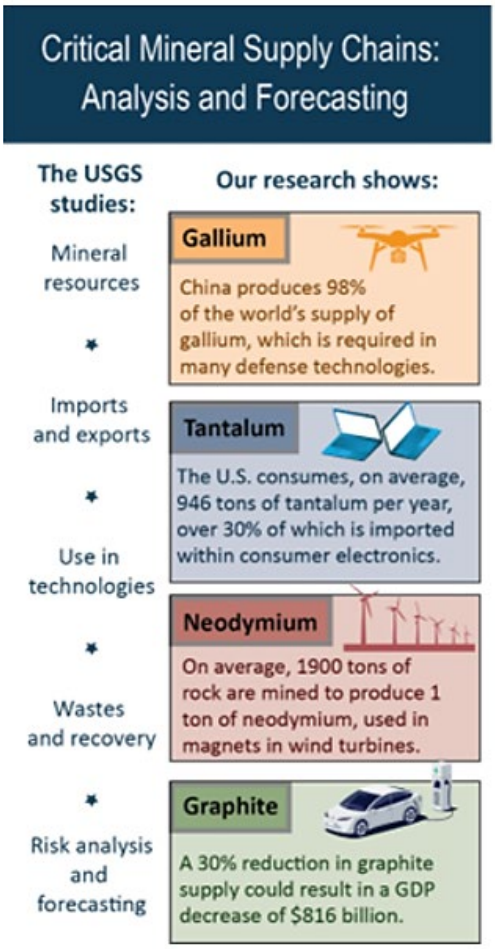
The Mineral Resources Program (MRP) provides science and data on the full life cycle of mineral resources that are essential to the economy and national security of the Nation. The MRP portfolio includes research and supply chain analysis on mineral potential, production, consumption, recycling, disposal, and interaction with the environment. The MRP maps, studies, and analyzes the global supply, demand, and trade of the full range of mineral commodities that are used in the United States and develops the USGS list of critical minerals from these studies. USGS researchers analyze and forecast domestic, foreign, and industrial sectoral dependencies on mineral commodities, and develop

Sampling an iron spring to detect critical minerals in mine waste at the Daisy Mine site near Crested Butte, Colorado. Credit: USGS

methodologies to quantify the Nation's mineral resources both "still in the ground" and in mine wastes. The USGS also provides relevant, timely, and unbiased scientific data to support government (Federal, State, Tribal, Territories) and private sector decision-making. For example, USGS mineral data and analysis inform Federal land management decisions, mine waste reclamation and remediation efforts, Federal trade negotiations, and public and private sector investments in economically significant supply chains for critical minerals.

Mineral Intelligence and Supply Chain Analysis: Through the National Mineral Information Center (NMIC) and its regular surveys of the mineral industries, the USGS MRP analyzes mineral production, consumption, sustainability, and availability, and answers more than 2,000 mineral resources inquiries monthly. This work allows decision makers to anticipate supply chain disruptions and ensure dependable supplies of minerals to meet economic and defense needs. The public and private sectors use this information to understand the supply and use of minerals in the economy, and to inform investments in all aspects of supply chains. The USGS has unique expertise in the flow of resources through the global economy and provides a cross-sectoral outlook that other agencies depend on to inform their investments. Agencies that rely on these analyses include the Departments of Commerce, Defense, Energy, and State, intelligence agencies, the Federal Reserve Board, foreign investment and credit agencies including the U.S. International Development Finance Corporation and Export-Import Bank, and the Office of the U.S. Trade Representative. State agencies, private sector minerals and manufacturing decision-makers, Wall Street market analysts, and foreign trade partners similarly rely on USGS data.





Source: USGS 2023 Mineral Commodity Summaries (https://doi.org/10.3133/mcs2023)

Critical Minerals Focus: The USGS leads a collaborative effort, working through the interagency National Science and Technology Council to solicit input from agencies across the government, to create a list of critical minerals that is used to inform investments across the Federal government as well as U.S. industry opportunities for tax credits through the Inflation Reduction Act (IRA). The 2022 list of critical minerals and the analysis behind it has informed investments from the BIL, IRA, and Research and Development, Competition, and Innovation Act (i.e., the CHIPS and Science Act). The USGS is currently collaborating with the National Science and Technology Council to better identify emerging supply risks and evaluate the impact of supply disruptions as part of producing the next whole-of-government list of critical minerals in 2025.

Mineral Resources Research, Surveys, and Assessments: The USGS conducts research on how and where mineral deposits form and develops methods to detect potential mineral resources. This research has resulted in the recognition of new types of mineral deposits and new methods to assess the Nation's undiscovered resources. The USGS draws on all of this research to evaluate the potential for domestic and global mineral resources ranging from major metals (e.g., copper) to industrial minerals (e.g., construction materials) to low-volume specialty minerals (e.g., rare earth elements).

Critical Minerals Focus: The MRP has initiated a series of assessments on critical minerals needed for the energy transition, including electric vehicle and grid energy storage applications, as authorized in the Energy Act of 2020. The MRP is currently conducting nationwide assessments of two critical minerals used in advanced batteries, graphite and lithium, and has recently completed regional tungsten assessments. These assessments will help policymakers and land managers strategically determine where to increase investments in sustainable domestic production, mine waste reprocessing and other forms of secondary production, and inform trade agreements with other nations.

The MRP also supports the USGS Coastal and Marine Hazards and Resources Program in its assessments of the distribution, composition, and environmental setting and resource potential of seafloor minerals, as well as associated environmental impacts of extraction.

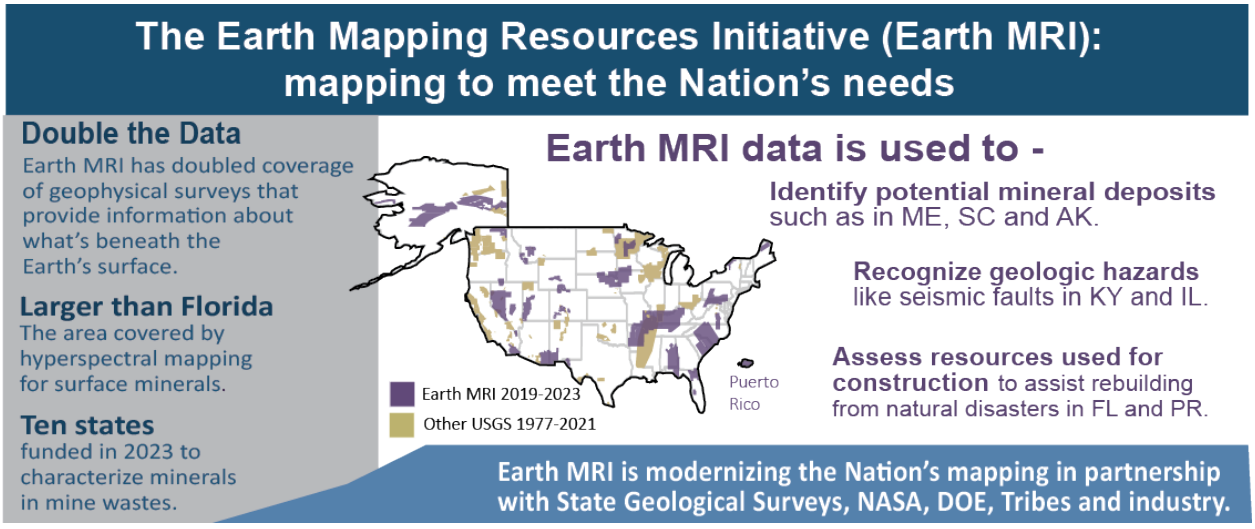
USGS research on mineral resources includes innovative research on mine waste as a resource and the interactions of minerals with the environment. This research identifies the potential for reprocessing valuable minerals from mine wastes, provides science to inform the reclamation of previously mined lands, and identifies emerging challenges and opportunities for future mining. The USGS is developing a

national mine waste inventory that will report future national resource assessments that will include both mineral deposits (minerals "above ground") for a more complete picture of the Nation's mineral resources. The foundation of the inventory is the USMIN database of current and historical mining locations in all 50 states and Puerto Rico; the first generation of USMIN was completed in 2023, in collaboration with BLM and the State Geological Surveys. USMIN is the Nation's authoritative database of current and historical mines, mineral deposits, mineral districts, and mine site features, including features important to managing abandoned mine site safety as well as mine waste features. Onto that foundation, MRP and State partners are adding new samples and laboratory analyses of mine waste through Earth MRI-funded grants.

In addition, Interior leads an interagency and intergovernmental collaboration to build on USMIN by compiling existing Federal and State data on historical (abandoned) mine lands managed by the Departments of the Interior, Agriculture, and Energy; the Environmental Protection Agency (EPA); and the Interstate Mining Compact Commission and its state members. MRP is also collaborating through the Federal Mining Dialogue with BLM, the Bureau of Indian Affairs, National Park Service, Office of Surface Mining Reclamation and Enforcement, U.S. Forest Service, and EPA to identify pilot sites to extract minerals from waste while supporting reclamation, remediation, and restoration. These efforts provide decision support on the benefits and risks of reprocessing, reclaiming, and restoring mine waste sites in light of environmental, community, and supply chain concerns.

> *Critical Minerals Focus:* Of the 2022 USGS list of 50 critical minerals, over half are predominantly byproducts (minerals developed incidental to other minerals' development or processing). Mine waste reprocessing is a likely path to strengthen domestic supplies of these critical minerals.

The MRP leads the U.S. government in strategic international collaborations such as the Critical Minerals Mapping Initiative with Geoscience Australia and the Geological Survey of Canada (GSC), which in 2023 for the first time harmonized data types and scientific names of geologic formations and mineral systems so that artificial intelligence can be used to improve the mapping of critical mineral deposits. The USGS is also the U.S. lead for the North American Leaders Summit commitment to critical minerals collaboration with the Servicio Geológico Mexicano and GSC to advance and accelerate research on and mapping of North American critical mineral resources.



Earth MRI: The United States is under-mapped relative to other developed nations. In 2019, the USGS launched Earth MRI to modernize mapping of the Nation's geologic framework and resources. Earth MRI collaborates with other USGS programs and Federal agencies, State agencies, Tribal governments, and the private sector to collect and analyze foundational geoscience datasets. Earth MRI data are foundational: they benefit many fields. Earth MRI data are essential to understand critical mineral potential, and also for infrastructure, transportation, and land-use planning; hazard assessments for earthquakes, landslides, volcanoes, and floods; water resources management; assessment of the potential for geothermal resources and geologic carbon storage; and emergency response.

With the BIL's provision of $320 million over five years, Earth MRI is rapidly collecting new airborne geophysical, lidar, and hyperspectral data and on-the-ground geologic mapping and geochemistry. Among Earth MRI's geophysical surveys are electromagnetic surveys that, in addition to helping characterize subsurface mineral resources, also support analysis of groundwater resources. Earth MRI's hyperspectral survey of the southwestern U.S. is one of the largest such surveys conducted, and will be valuable to characterize surface mineral resources, mine waste sites, acid mine drainage, debris flows, agriculture, and wildfire hazards and impacts.

The USGS is also investing in data delivery to maximize the accessibility and utility of both new and historical datasets. This effort includes developing new tools for accessing and analyzing the vast amount of data collected by the Earth MRI. The USGS is also partnering with other agencies and with technologists to increase access to legacy mining information and statistics on mineral production, trade, and supply chains.

> *Critical Minerals Focus:* In order to prioritize data collection for Earth MRI, the USGS collaborated with State Geological Surveys and other partners to publish a map of important mineral systems across the Nation. This is the Nation's first map highlighting areas that may contain each of the 50 minerals on the whole-of-government list of critical minerals. This effort helps prioritize new geologic, geochemical, topographic, geophysical, and hyperspectral mapping and data acquisition, and informs both industry and land managers of areas with potential for subsurface critical mineral resources.

Natural Hazards

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Natural Hazards

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Earthquake Hazards Program	**92,651**	**92,651**	**+1,264**	**0**	**+951**	**94,866**	**+2,215**
FTE	***238***	***238***	***0***	***0***	***+3***	***241***	***+3***
Volcano Hazards Program	**37,500**	**37,500**	**+801**	**0**	**+1,383**	**39,684**	**+2,184**
FTE	***144***	***144***	***0***	***0***	***+0***	***144***	***+0***
Landslide Hazards Program	**14,432**	**14,432**	**+253**	**0**	**-648**	**14,037**	**-395**
FTE	***44***	***44***	***0***	***0***	***-1***	***43***	***-1***
Global Seismographic Network Program	**7,273**	**7,273**	**+63**	**0**	**+100**	**7,436**	**+163**
FTE	***12***	***12***	***0***	***0***	***+0***	***12***	***+0***
Geomagnetism Program	**5,251**	**5,251**	**+74**	**0**	**+119**	**5,444**	**+193**
FTE	***14***	***14***	***0***	***0***	***+0***	***14***	***+0***
Coastal/Marine Hazards and Resources Program	**43,149**	**43,149**	**+1,106**	**0**	**+4,919**	**49,174**	**+6,025**
FTE	***202***	***202***	***0***	***0***	***+4***	***206***	***+4***
Natural Hazards Total	**200,256**	**200,256**	**+3,561**	**0**	**+6,824**	**210,641**	**+10,385**
FTE	***654***	***654***	***0***	***0***	***+6***	***660***	***+6***

The 2025 budget request for the Natural Hazards Mission Area is $210,641,000 and 660 FTE, a program change of +$6,824,000 and +6 FTE from the 2024 CR.

Mission Area Overview

Every year in the U.S., natural hazards threaten lives and livelihoods and result in billions of dollars of damage to personal property and national infrastructure. The USGS, through the Natural Hazards Mission Area (NHMA) works to monitor, assess, conduct targeted research, and provide information supporting alerts and warnings for a wide range of natural hazards so policymakers and the public have the understanding they need to enhance preparedness, response, and resilience. NHMA provides scientific information to emergency responders, policymakers, and the public to reduce losses from a wide array of natural hazards, including earthquakes, hurricanes, landslides, tsunamis, volcanic eruptions, and geomagnetic storms, as well as longer-term climate change-driven impacts such as sea level rise, coastal erosion, and wildfire extent and severity. The USGS delivers actionable assessments of these hazards and helps to integrate this information into risk reduction activities and to develop effective strategies for achieving more-resilient communities. The USGS is the Federal agency responsible for monitoring and

notification of earthquakes, volcanic activity, landslides, and coastal change in the United States. For many other hazards, such as tsunamis and flooding, the USGS directly supports the warning responsibility of the National Oceanic and Atmospheric Administration (NOAA), and other Federal or State agencies. These responsibilities also include a science response to natural hazards, including earthquakes, volcanic activity, landslides, coastal inundation, and geomagnetic storms.

To achieve its primary mission, and to fulfill its responsibilities for loss and risk reduction, the USGS NHMA develops, delivers, and applies several components of hazard science; hazard forecasts and warnings, and crisis and disaster response are all underpinned by USGS observations and targeted research. The research, data, products, and detailed information regarding natural hazards that the USGS provides enable Federal, State, Tribal, local, and private-sector end-users to better understand, anticipate and reduce their risks associated with natural and environmental hazards. These efforts enable science-based decisions that effectively enhance resilience and reduce impacts from those threats.

FY 2023 Selected Mission Area Accomplishments

- The Coastal/Marine Hazards and Resources Program released the Coastal Science Navigator (https://www.usgs.gov/apps/coastalsciencenavigator/index.html) to serve stakeholders as a dynamic resource to discover pertinent coastal change hazards information, products, and tools relevant to their scientific or decision-making needs. This online platform consolidates CMHRP scientific resources dedicated to coastal hazards, risk, and resilience through an accessible, searchable hub.
- The USGS and partners continue to make progress on the seismic network buildout for the *ShakeAlert* earthquake early warning system. At the end of FY 2023, *ShakeAlert* was 89% built out. This progress also contributes to build out of the Advanced National Seismic System (ANSS).
- As the co-chair of the U.S. Coral Reef Task Force (USCRTF), the Department of the Interior, along with NOAA, combined the expertise of a combined 14 Federal agencies, seven U.S. States, Territories, Commonwealths, and three Freely Associated States to advance the understanding and use of coral reefs as natural storm protection for coastal communities. In Puerto Rico, the USCRTF identified the need for coral reef management, recovery, and restoration following Hurricanes Irma and Maria; the USGS assessed the hazard risk reduction benefits from coral reef restoration for Puerto Rico. This effort identified the reef-fronted coastal communities that would receive the greatest protection benefits by coral reef restoration and supported a benefit:cost analysis for the Puerto Rico Department of Natural and Environmental Resources. These efforts underpinned a $38.6 million award from the FEMA Hazard Mitigation Grant Program to Puerto Rico to restore the reefs off San Juan.
- In FY 2023, the USGS concluded the work of updating the National Seismic Hazard Model and completing an extensive public and expert review process. For the first time, the 2023 update includes a unified, comprehensive model for all 50 states. This comprehensive update was published on December 29, 2023.
- The USGS delivered 25 post-fire debris-flow hazard assessments covering more than a half-million acres on Federal, State, Tribal, and private lands; meeting requests from U.S. Forest Service, Interior, and state-organized Burned Area Emergency Response teams. The USGS met the requests from emergency management officials in Hawai'i for multiple assessments after the tragic Maui wildfires. Although the threat of debris flows from the burned area was low, these

assessments were valuable to emergency management and others as they prioritized response, recovery, and rebuilding decisions and actions.

- The USGS continues to cooperate with Federal and State partners to surveil landslide motion and monitor meteorological and geophysical conditions contributing to slope instability in AK. In the Fall of 2022 widespread landslide motion was observed using terrestrial radar technology and the USGS led a coordinated effort with the National Weather Service's National Tsunami Warning Center to inform stakeholders and partners of the potential for rapid landslide motion and subsequent local tsunami.
- The USGS Volcano Hazards Program completed the primary buildout phase of a system to detect lahars originating on Mount Rainier, Washington. The system, including 33 new stations, is a substantial upgrade of an effort begun in the mid-1990s with Mount Rainier National Park, Washington State Emergency Management Division, and the Pierce County Department of Emergency Management. Additionally, the USGS worked with U.S. Forest Service to install a permanent network of seismic and Global Navigation Satellite System instruments to monitor earthquakes and ground deformation at Mount Edgecumbe, a volcano 16 miles west of Sitka, Alaska. The installations were deemed crucial to enable early warning of future eruption after seismic activity and uplift are detected indicating magma is rising beneath the volcano.
- The USGS provided rapid information on tens of thousands of earthquakes that struck during FY 2023 within the United States and worldwide through the Advanced National Seismic System (ANSS). In FY 2023, the USGS provided information on over 19,000 magnitude 3 and larger earthquakes worldwide, including over 1,600 magnitude 5 and larger, 132 magnitude 6 and larger, and 20 magnitude 7 and larger.
- The USGS operated the Global Seismographic Network (GSN) at a high level of data return and data quality. The data return of the USGS GSN stations went from 72% in FY 2005 to 88% in FY 2023 due to the replacement of the aging data acquisition systems with modern equipment; ongoing upgrades of borehole sensors; and improved procedures, including the development and use of the Data Quality Analyzer software. Improved data availability and quality allows the USGS to better characterize seismic signals across a very large range of frequencies, including great subduction zone earthquakes (e.g., Japan, Alaska), moderate crustal earthquakes (e.g., California), and smaller natural and manmade seismic events (e.g., North Korea).
- The USGS, NOAA, and Natural Resources Canada jointly developed and released a new United States/Canada 1D geoelectric field map product (https://www.swpc.noaa.gov/news/new-experimental-us-canada-1d-geoelectric-field-map). This product maps the geoelectric field, which is a direct indicator of the impact of space weather on the electrical power grid and other ground-level artificial conducting pathways. The maps update every minute using magnetometer data from the USGS Geomagnetism Program for the U.S. portion of the map. The product provides accurate and timely information to allow power grid operators to better protect their systems in the event of severe space weather.
- Throughout FY 2023, the USGS supported preparation and response efforts for severe storms and major events including Hurricane Ian in the Gulf of Mexico and Typhoon Merbok in Alaska. These efforts utilized a collaborative approach of coastal storm inundation and erosion data collection and forecasts, shoreline monitoring, and modeling applications.
- USGS social scientists with the NHMA Risk Project released a report on equitable engagement in research design (https://pubs.usgs.gov/of/2023/1072/ofr20231072.pdf). The report explains how

natural and physical scientists, both within USGS and externally, can make their research and approaches to research more equitable. This aligns with, and contributes to, NHMA's interest in advancing diversity, equity, inclusion and accessibility (DEIA) at the USGS.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

Natural Hazards
Earthquake Hazards Program

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Earthquake Hazards Program	**92,651**	**92,651**	**+1,264**	**0**	**+951**	**94,866**	**+2,215**
Subduction Zone Science	[2,700]	[2,700]	[0]	[0]	+1,500	[4,200]	[+1,500]
Earthscope Stations for Alaska	[3,000]	[3,000]	[0]	[0]	-1,463	[1,537]	[-1,463]
EEW/ShakeAlert - Geodesy	[28,600]	[28,600]	[0]	[0]	-1,500	[27,100]	[-1,500]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+2,414	[2,414]	[+2,414]
FTE	***238***	***238***	***0***	***0***	***+3***	***241***	***+3***

Justification of 2025 Program Changes

The 2025 budget request for the Earthquake Hazards Program (EHP) is $94,866,000 and 241 FTE, a program change of +$951,000 and +3 FTE from the 2024 CR.

Subduction Zone Science (+$1,500,000 / +3 FTE) – The proposed increase supports work to improve the understanding of risks posed to vulnerable communities in subduction zone environments and expand support for subduction zone hazard characterization and risk reduction.

The USGS would accelerate the implementation of the USGS Subduction Zone Science Plan, *Reducing Risk Where Tectonic Plates Collide* (USGS Circular 1428; https://pubs.usgs.gov/circ/1428/cir1428.pdf). This plan describes work necessary to support targeted multi-hazards subduction zone science investment across USGS Mission Areas. Subduction zones, where one tectonic plate is thrust over another, generate the world's largest earthquakes, volcanic eruptions, landslides, and tsunamis. Subduction zones generate hazards onshore and offshore in the Pacific Northwest (Cascadia subduction zone), southern Alaska (Alaska-Aleutians subduction zone), the Caribbean, and Pacific Island Territories, and tsunami hazards extend to Hawaii, California, and East Coast States. Subduction zones remain poorly understood because the processes that drive the hazard lie offshore. Future disastrous events in these regions are inevitable and require investment in subduction zone science that will inform decisions at all levels of society.

Requested funding would support targeted efforts, including seafloor geodetic monitoring aimed at improving the USGS' ability to detect the build-up of stresses leading to future earthquakes. Funding would also expand internal and external support for work focused on hazard and risk reduction, including research on subduction zone processes, particularly in the Cascadia subduction zone. Efforts would be focused on minimizing community vulnerability via the delivery of data and products that improve understanding of hazard and risk. Through these

activities, the USGS would make emergency response and recovery activities more effective, and ultimately, help citizens prepare for, react to, and recover from subduction zone hazards.

EarthScope Stations for Alaska (**-$1,463,000 / -0 FTE**) – To fund higher priorities, the proposed reduction would scale back USGS support for operations and maintenance of 43 EarthScope USArray seismic stations in Alaska, and for enhancing network operations at the Alaska Earthquake Center (AEC) at the University of Alaska at Fairbanks by about 50 percent. This reduction would require AEC to find alternative support to continue to operate the full collection of these stations, or suspend operations or close some of them. The core network funded by EHP/ANSS that is suitable for monitoring the highest risk areas of the state would continue to operate as is.

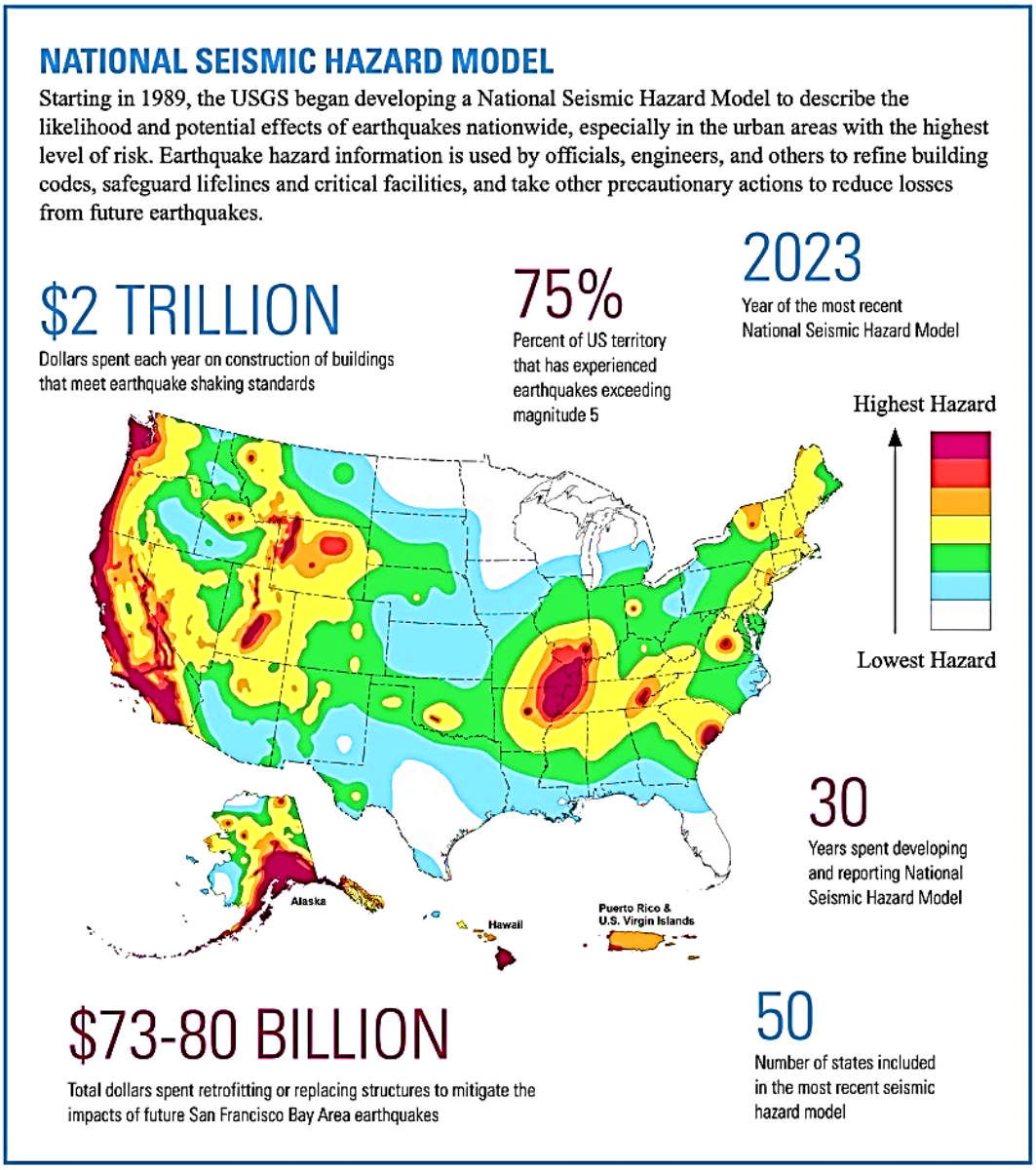
Earthquake Early Warning (EEW)/*ShakeAlert* - Geodesy (**-$1,500,000 / -0 FTE**) – To fund higher priorities, the proposed reduction would cease efforts to incorporate geodetic data into the EEW system. Geodetic sensors improve the accuracy of rapid magnitude estimates for the largest earthquakes (magnitude 7.5 and greater). Operations and development of *ShakeAlert* using seismic network data (currently at 90% completion) would be sustained, which is now delivering alerts to the general public across all three west coast states. This reduction would not impact the continued progress of seismic station buildout.

Baseline Capacity - 2024 Fixed Costs (**+$2,414,000 / +0 FTE**) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $2,414,000 in the EHP which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

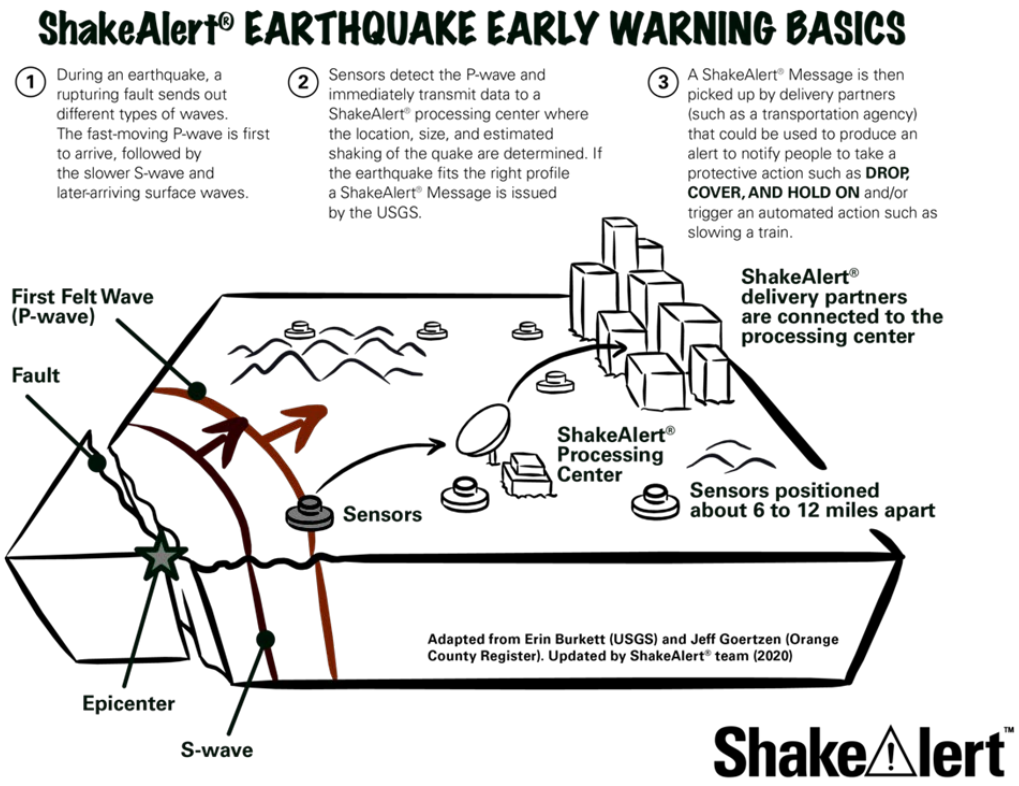
Half of the U.S. population is at risk from potentially damaging earthquakes and annualized earthquake losses to the United States infrastructure are estimated at $14.7 billion per year. The USGS provides the scientific information, situational awareness, and knowledge necessary to reduce deaths, injuries, and economic losses from earthquakes and earthquake-induced tsunamis, landslides, and soil liquefaction.

The USGS EHP is the applied Earth science component of the four-Agency National Earthquake Hazards Reduction Program (NEHRP, reauthorized by the National Earthquake Hazards Reduction Program Reauthorization Act of 2018, P.L. 115-307). Through NEHRP, the USGS partners with the FEMA, National Science Foundation (NSF), and National Institute of Standards and Technology (NIST) to reduce earthquake losses in the United States. To effect loss reduction, the EHP supports a highly coordinated set of monitoring, hazards assessment, applied research, and risk translation and communication activities in at-risk regions nationwide. Through the National Earthquake Information Center (NEIC), the USGS is the only U.S. agency that continuously reports on current domestic and worldwide earthquake activity. Through the ANSS, the USGS and its State and university partners monitor and report on earthquakes nationwide. *ShakeAlert*, a west coast EEW system built upon ANSS, offers new capabilities for seconds of advanced warning to people and systems ahead of earthquake shaking.



Through the USGS National Seismic Hazard Model, the EHP provides the basis for seismic provisions in the Nation's building codes, which affect one trillion dollars' worth of new construction annually in the United States. The USGS also issues timely aftershock forecasts following potentially damaging earthquakes within the United States and its Territories and provides aftershock forecasts following significant global earthquakes when called upon by other Federal agencies or international partners.

In FY 2025, the USGS will continue, in cooperation with States and other partners, to finalize build out, operate, and maintain the *ShakeAlert* EEW system based on the Technical Implementation Plan for the west coast, which was revised in 2018 (https://pubs.er.usgs.gov/publication/ofr20181155).



The graphic above describes the basics of how the *ShakeAlert* earthquake early warning system operates during an earthquake. Source: USGS.

In FY 2023, more than 40 entities were the recipients of approximately $28 million of funding and equipment that supports earthquake research in high-risk areas nationwide, contributes to the maintenance and operation of the ANSS, and supports the *ShakeAlert* west coast EEW system. In FY 2025, the EHP will continue to provide universities, State geological surveys, and private institutions with earthquake hazards applied research grants and cooperative agreements.

Natural Hazards
Volcano Hazards Program

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Volcano Hazards Program	**37,500**	**37,500**	**+801**	**0**	**+1,383**	**39,684**	**+2,184**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,383	[1,383]	[+1,383]
FTE	***144***	***144***	***0***	***0***	***+0***	***144***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the Volcano Hazards Program (VHP) is $39,684,000 and 144 FTE, a program change of +$1,383,000 and 0 FTE from the 2024 CR.

Baseline Capacity - 2024 Fixed Costs (+$1,383,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a robust and talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $1,383,000 in the Volcano Hazards Program, which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

There are approximately 170 potentially active volcanoes in the United States and its territories. Volcanic eruptions are among the most destructive natural phenomena and can have significant social and economic impacts. The mission of the USGS VHP is to enhance public safety and minimize social and economic disruption from volcanic unrest and eruption. Through the VHP, USGS scientists monitor active and potentially active volcanoes, assess their hazards, and conduct targeted research to better understand volcanic processes. This work enables the USGS to provide assessments of volcano hazards, warnings of potential volcanic impacts, volcanic activity alerts, and other information to authorities and the public. These warnings and forecasts enable emergency responders, land managers, and the public to mitigate the risk to life and property. The USGS has evaluated the Nation's volcanoes to determine the monitoring levels needed commensurate with the threat they pose.

The National Volcano Early Warning System (NVEWS) is being implemented by USGS and will ensure that the Nation's volcanoes are monitored at levels commensurate with their threat. This enables scientists to improve the timeliness and accuracy of hazard warnings, making it possible for citizens to take proper and timely action to reduce risk. NVEWS seeks to improve the capabilities of the U.S. volcanology community, including: (1) increased partnerships with local governments and emergency responders; (2)

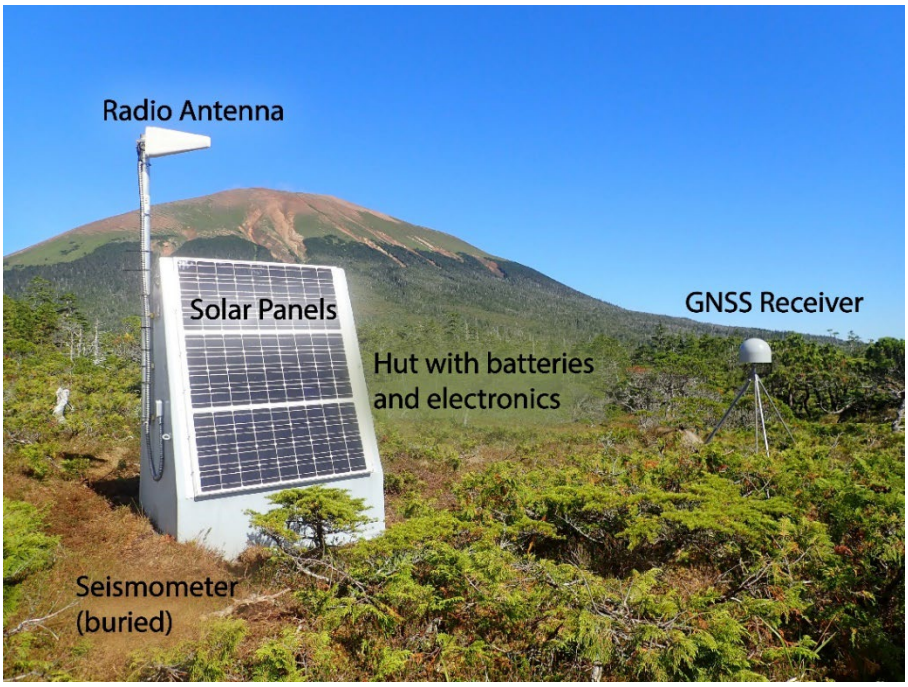
additional staffing and automation to improve 24/7 monitoring of volcanoes; and (3) advanced and unified systems to distribute data to scientists, responding agencies, and the public.

As part of the NVEWS implementation, the VHP intends to complete the next generation lahar detection system in all major drainages of Mount Rainier by October 2025 now that the primary build out phase in the drainages on Mount Rainier is complete. In FY 2024, the USGS will begin steps to apply this technology to other Cascades volcanoes in Washington such as Mt. Baker and Mt Adams, where lahars are a documented hazard.

The VHP is executed by the USGS Volcano Science Center (VSC), which operates five volcano observatories with State and academic partners. The observatories are organized into distinct geographic areas of responsibility:

- Hawaiian Volcano Observatory – Hawaii
- Cascades Volcano Observatory – Idaho, Oregon, and Washington
- Alaska Volcano Observatory – Alaska and the Commonwealth of the Northern Mariana Islands
- California Volcano Observatory – California and Nevada
- Yellowstone Volcano Observatory – Arizona, Colorado, Montana, New Mexico, Utah, and Wyoming

Under the leadership of the VSC, each observatory is responsible for volcano monitoring, community preparedness (including the development and regular practice of volcano hazard emergency response plans), managing volcanic crises, and coordinating research in their areas of responsibility.



A new volcano monitoring site was installed in 2023 at Mount Edgecumbe in southeast Alaska, located near the community of Sitka. In 2022, the USGS detected magma rising into the volcano. At the time, the volcano hosted no monitoring instruments, and all activity was detected by the regional seismic network and satellites. In the summer of 2023, the USGS and Alaska Volcano Observatory partners installed three new monitoring sites, which closing the monitoring gap for the volcano. The new instruments will track activity and provide early warning of volcanic eruptions to share with emergency professionals to reduce loss to possibly impacted populations. Source: VHP

Natural Hazards
Landslide Hazards Program

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Landslide Hazards Program	**14,432**	**14,432**	**+253**	**0**	**-648**	**14,037**	**-395**
Cooperative Landslide Hazards and Assessment Competitive Grant Program	[1,000]	[1,000]	[0]	[0]	-1,000	[0]	[-1,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+352	[352]	[+352]
FTE	***44***	***44***	***0***	***0***	***-1***	***43***	***-1***

Justification of 2024 Program Changes

The 2025 budget request for the Landslide Hazards Program (LHP) is $14,037,000 and 43 FTE, a program change of -$648,000 and -1 FTE from the 2024 CR.

Cooperative Landslide Hazards and Assessment Competitive Grant Program (-$1,000,000 / -1 FTE) – The budget does not request funds for this program to allow the USGS to focus on higher priority research activities.

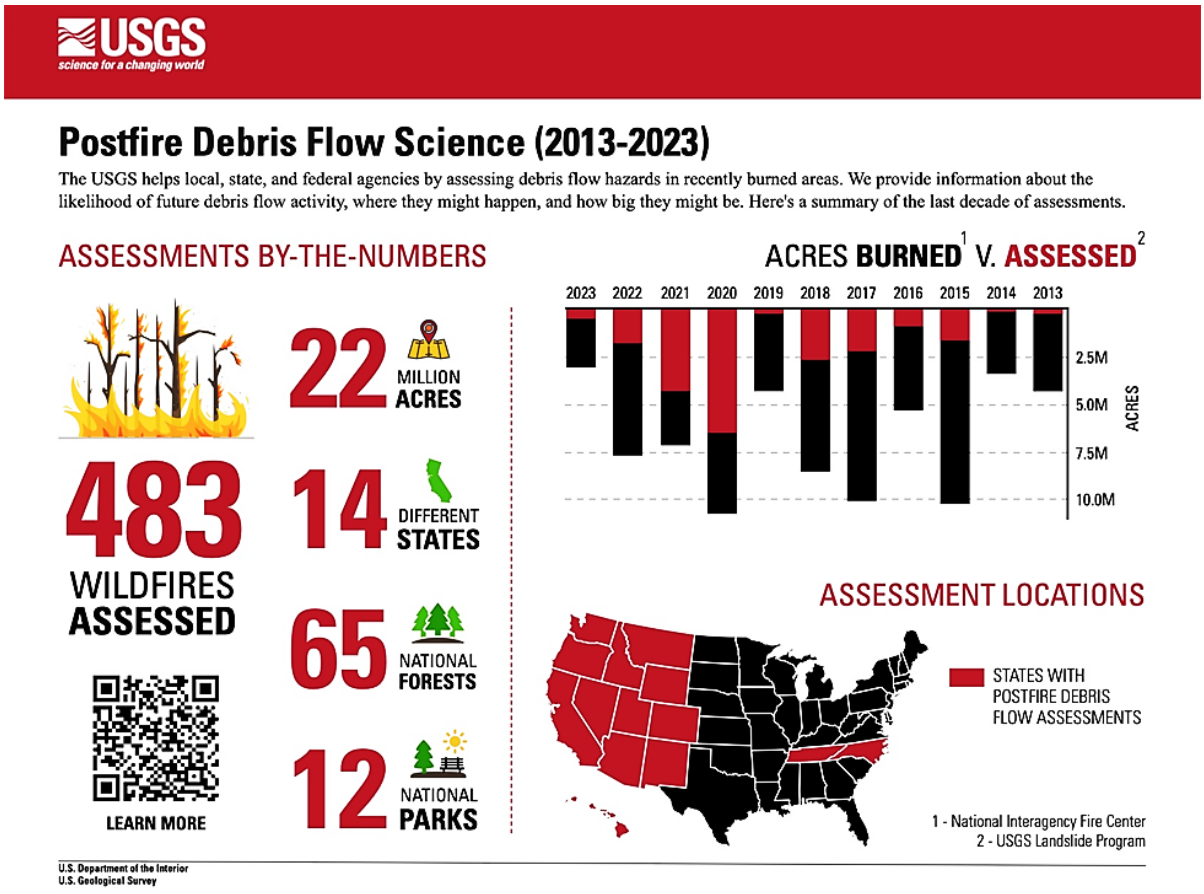
Baseline Capacity - 2024 Fixed Costs (+$352,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $352,000 in the Landslide Hazards Program which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

Landslides occur in all 50 States and many Territories, and where landslides impact human activities, lives may be lost and property and infrastructure damaged. Widespread landslides can accompany big storms or earthquakes, impacting broad areas and hindering rescue and recovery efforts. For example, in 2017, Hurricane Maria generated more than 70,000 landslides across Puerto Rico, impacting transportation and other lifelines, and hampering response, recovery, and rebuilding. The USGS LHP is the only Federal program dedicated to landslide hazard science and conducts targeted studies to understand landslide initiation and mobility processes. This understanding is used to (1) develop methods and models for landslide hazard assessment, (2) develop and deploy systems to monitor threatening landslides, and (3) develop methods and tools for landslide early warning and situational awareness. Program activities are targeted toward the types of landslides that result in human and economic losses in

the United States, such as those with long travel distances, those initiated by heavy rainfall, and those exacerbated by the effects of wildfire. The USGS assists Federal, State, and local agencies through landslide site evaluations and provides strategies for reducing ongoing and future impacts from landslides. The LHP deploys near-real-time monitoring systems at active landslide sites to gather continuous movement, rainfall, and hydrologic data needed to understand the mechanisms of landslide occurrence and mobility and forecast future behavior. Such data and understanding form the scientific underpinnings for early warning of conditions that may trigger landslides.

The LHP began cooperative work with the National Weather Service in 2005 to deliver alerts for debris flows from recently burned areas in southern California. This limited-scale project has provided essential guidance to emergency, land, and transportation managers for many burned areas in the western U.S., including the 2020 Grizzly Creek Fire in central Colorado, and the 2021 Dixie and North Complex Fires in the central Sierra Nevada of California. In FY 2025, the LHP and National Weather Service will continue to build on recent scientific advances to expand the project to other parts of California and the western U.S. to meet the intent of the National Landslide Preparedness Act.



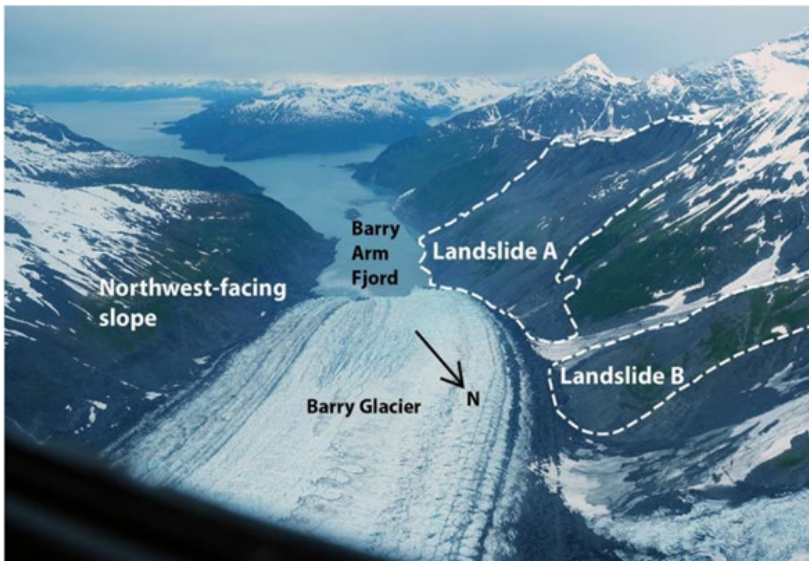
The USGS delivers assessments of the potential and possible size of post-fire debris flows at the request of local, state, and federal land and emergency managers. The assessments are also used by the National Weather Service to provide debris-flow alerts for recently burned areas. Source: LHP

In FY 2021, the National Landslide Hazard Preparedness Act was enacted and directs the Secretary of the Interior, acting through the Director of the USGS, to establish a program to identify risks and hazards from landslides, reduce losses, protect communities at risk, and improve communication and emergency

preparedness. In response, the USGS published a National strategy for landslide loss reduction and formed an Interagency Coordinating Committee on Landslide Hazards. In FY 2025, the Interagency Committee will support the implementation of the National Landslide Hazard Preparedness Act.

The USGS is working to develop and deliver actionable landslide hazard and risk modeling for vulnerable populations and high-risk settings with an emphasis on areas recently burned by wildfire. These activities are building on advances in landslide hazard assessment and data collection funded through recent appropriations. The USGS is also initiating efforts to meet requirements set out in the National Landslide Preparedness Act by developing a Federal capacity to deploy scientists and assets to assist emergency response to landslide events. Further, the USGS is expanding its capacity to deliver enhanced landslide hazard and risk assessments and provide situational awareness and technical assistance to emergency response in support of the Interior, U.S. Forest Service, FEMA, State geological surveys, and State and emergency management. Work is being conducted in partnership with technical expertise from State, academic, and private sectors and data and products and will benefit land and emergency managers at all levels as well as the general public across the western United States and other States and Territories with landslide risk.

In FY 2025, the LHP will continue to lead efforts with Federal and State partners to collect data and conduct analyses to assess the hazard from landslides with the potential to generate tsunami in Prince William Sound, AK. Since FY 2020, the LHP has been surveilling landslide movement of the unstable slopes at the terminus of the Barry Glacier using satellite radar and other methods to inform the National Tsunami Warning Center and land and emergency managers of potential hazards.



The USGS is working with Federal and State partners to assess the risk of a catastrophic landslide and tsunami at the terminus of a retreating glacier in Prince William Sound, Alaska. This photo shows the Barry Arm Fjord of Prince William Sound, the area of potential landslides outlined, and the retreating Barry glacier in the middle foreground. Photo taken by Gabe Wolken, June 2020 Source: Public domain.

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Natural Hazards
Global Seismographic Network

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Global Seismographic Network Program	**7,273**	**7,273**	**+63**	**0**	**+100**	**7,436**	**+163**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+100	[100]	[+100]
FTE	***12***	***12***	***0***	***0***	***+0***	***12***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the Global Seismographic Network (GSN) is $7,436,000 and 12 FTE, a program change of +$100,000 and 0 FTE from the 2024 CR.

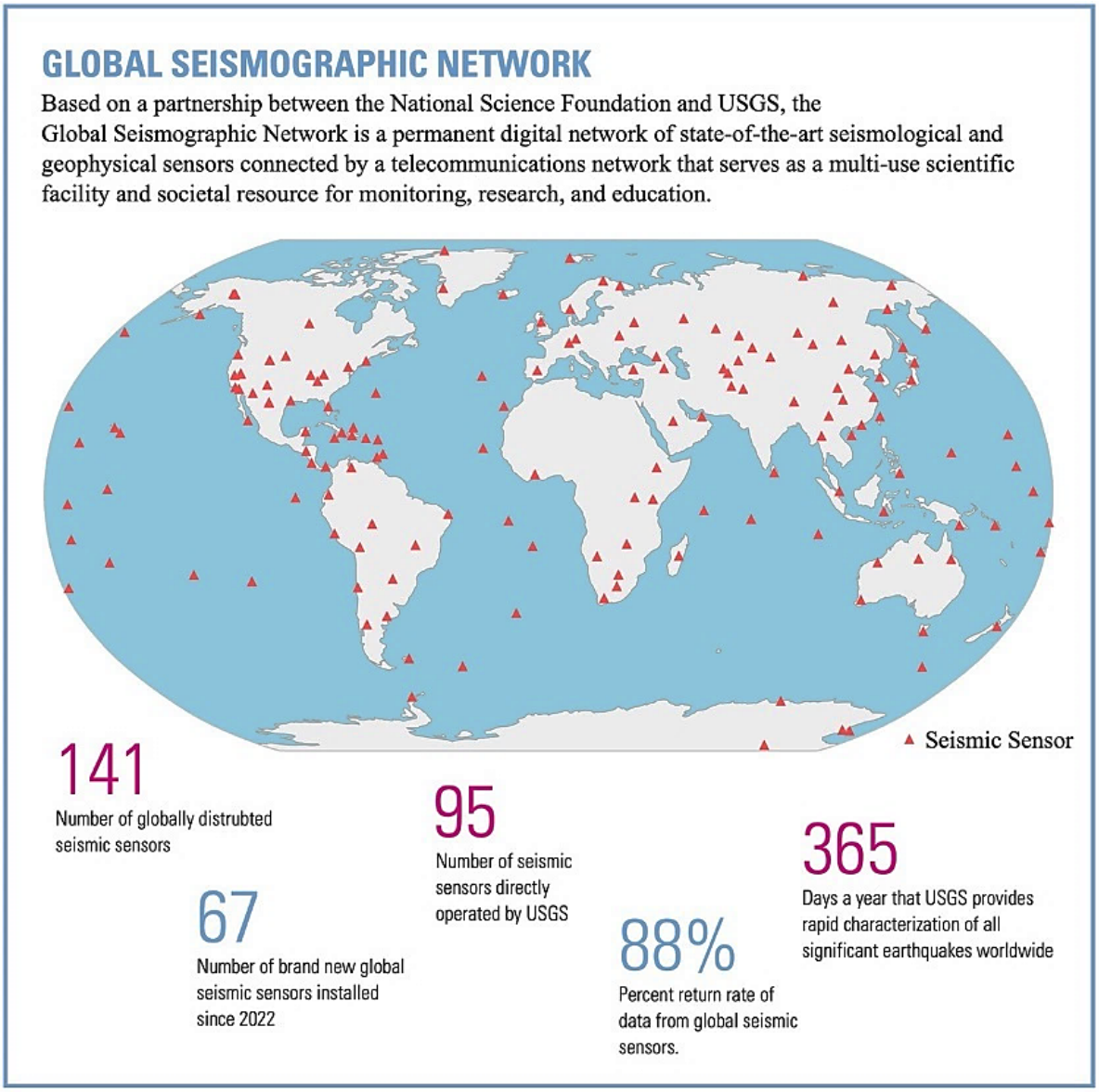
Baseline Capacity - 2024 Fixed Costs (+$100,000 / +0 FTE) The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $100,000 in the Global Seismographic Network which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

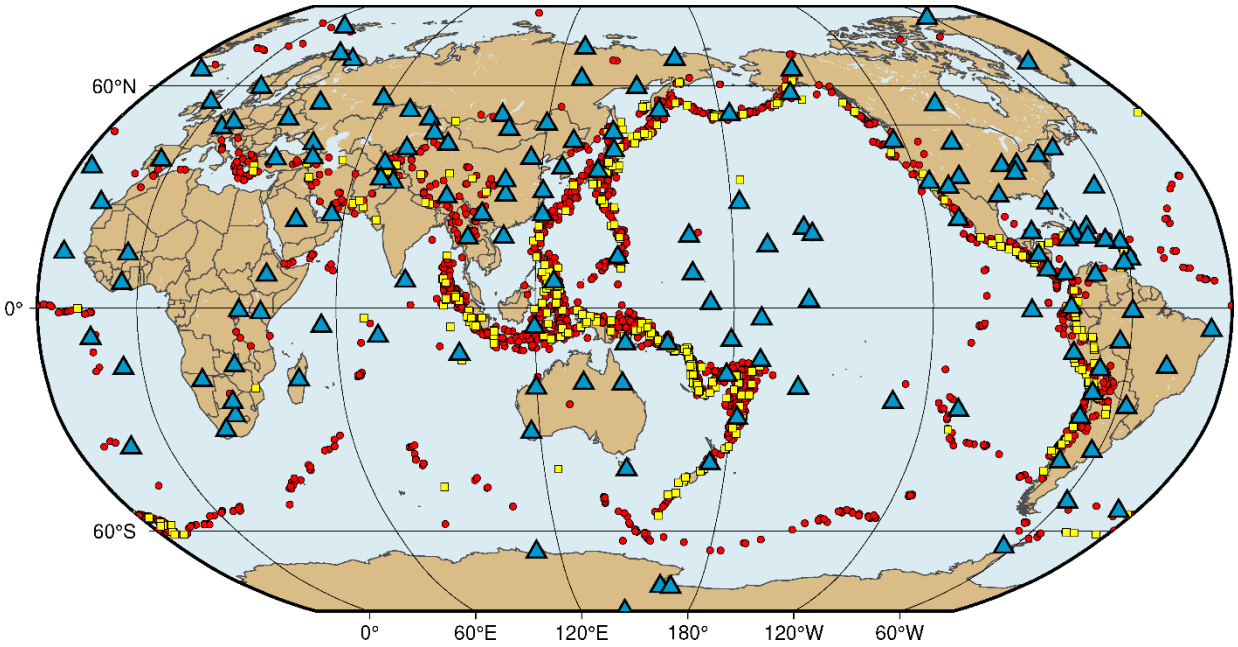
The GSN consists of around 150 globally distributed stations, 100 of which are operated by the USGS. The GSN is a partnership between the USGS and NSF and is implemented in partnership with the EarthScope Consortium and many other entities. It provides the high-quality seismic data needed for global earthquake alerts and situational awareness products, tsunami warnings, national security (through nuclear test treaty monitoring and research), seismic hazard assessments and earthquake loss reduction, as well as research on earthquake sources and the structure and dynamics of the Earth.

Because of its real-time data delivery, the GSN is a critical element of USGS hazard alerting activities, and supports activities of other Federal agencies, including NOAA tsunami warnings; NSF basic research; and Department of Energy and Department of Defense nuclear test treaty monitoring and research. GSN stations transmit real-time data continuously to the USGS NEIC in Golden, CO, where that data is used to rapidly determine the locations, depths, magnitudes, and other parameters of earthquakes worldwide, in conjunction with data from other networks. GSN data allows for the rapid determination of the location and orientation of the fault that caused the earthquake and provides an estimate of the length of the fault that ruptured during the earthquake, which are both essential for modeling earthquake effects. An

additional important aspect of GSN activities is evaluating, developing, and advancing new technologies for seismic instrumentation, sensor installation, and seismic data acquisition and management.



GSN operation is accomplished in cooperation with international partners who, in most cases, provide facilities to shelter the instruments and personnel to oversee the security and operation of each station. USGS responsibilities include station maintenance and upgrades, overseeing telecommunications, troubleshooting problems and providing major repairs, conducting routine service visits, training station operators, providing limited financial aid in support of station operations at sites lacking a host organization, and ensuring data quality and completeness.



GSN stations (triangles) are shown against a backdrop of large earthquakes from 2000 to 2021 (red circles – magnitude 6-6.9, yellow squares – magnitude 7 and larger earthquakes). Source: USGS

In order to maintain high-quality seismic data standards, the USGS and the EarthScope Consortium have recently installed new high-quality Very Broadband seismic sensors and have been improving the physical infrastructure of select GSN sites. These activities will continue in FY 2025.

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Natural Hazards
Geomagnetism Program

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Geomagnetism Program	**5,251**	**5,251**	**+74**	**0**	**+119**	**5,444**	**+193**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+119	[119]	[+119]
FTE	***14***	***14***	***0***	***0***	***+0***	***14***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the Geomagnetism Program is $5,444,000 and 14 FTE, a program change of +$119,000 and 0 FTE from the 2024 CR.

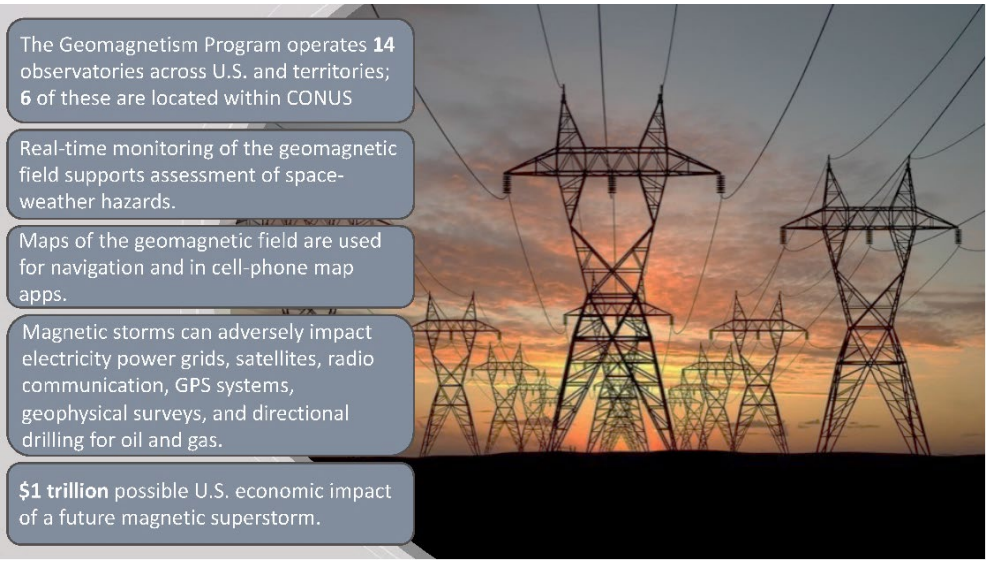
Baseline Capacity - 2024 Fixed Costs (+$119,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $119,000 in the Geomagnetism Program which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

The Geomagnetism Program provides data and information on short-term and long-term variations in the strength and direction of the Earth's magnetic field, including the intensity of magnetic storms. These data and information are provided through operation of a network of geomagnetic observatories and research and analyses related to geomagnetic hazards that threaten the economy and national security. Magnetic storms are caused by the dynamic interaction of the Earth's magnetic field with the Sun. While magnetic storms often produce beautiful aurora lights that can be seen at high latitudes, they can also wreak havoc on the infrastructure and activities of our modern, technologically-based society. Large storms can induce voltage surges in electric-power grids, causing blackouts and the loss of radio communication, reduce GPS accuracy, damage satellite electronics, and affect satellite operations, enhance radiation levels for astronauts and high-altitude pilots, and interfere with directional drilling for oil and gas.

The Geomagnetism Program is part of the U.S. National Space Weather Program (NSWP), an interagency collaboration that includes NASA, Department of Defense, NOAA, NSF, and Department of Energy. The Geomagnetism Program provides data to the NSWP agencies, oil drilling services companies, geophysical surveying companies, and several international agencies. In addition, Geomagnetism Program data is provided to International Real-time Magnetic Observatory Network (INTERMAGNET), an organization with a worldwide membership drawn from institutes operating

geomagnetic observatories who coordinate geomagnetic monitoring around the world. Data, products, and services from the USGS are also used by the electric-power industry to evaluate geomagnetic storm risk.



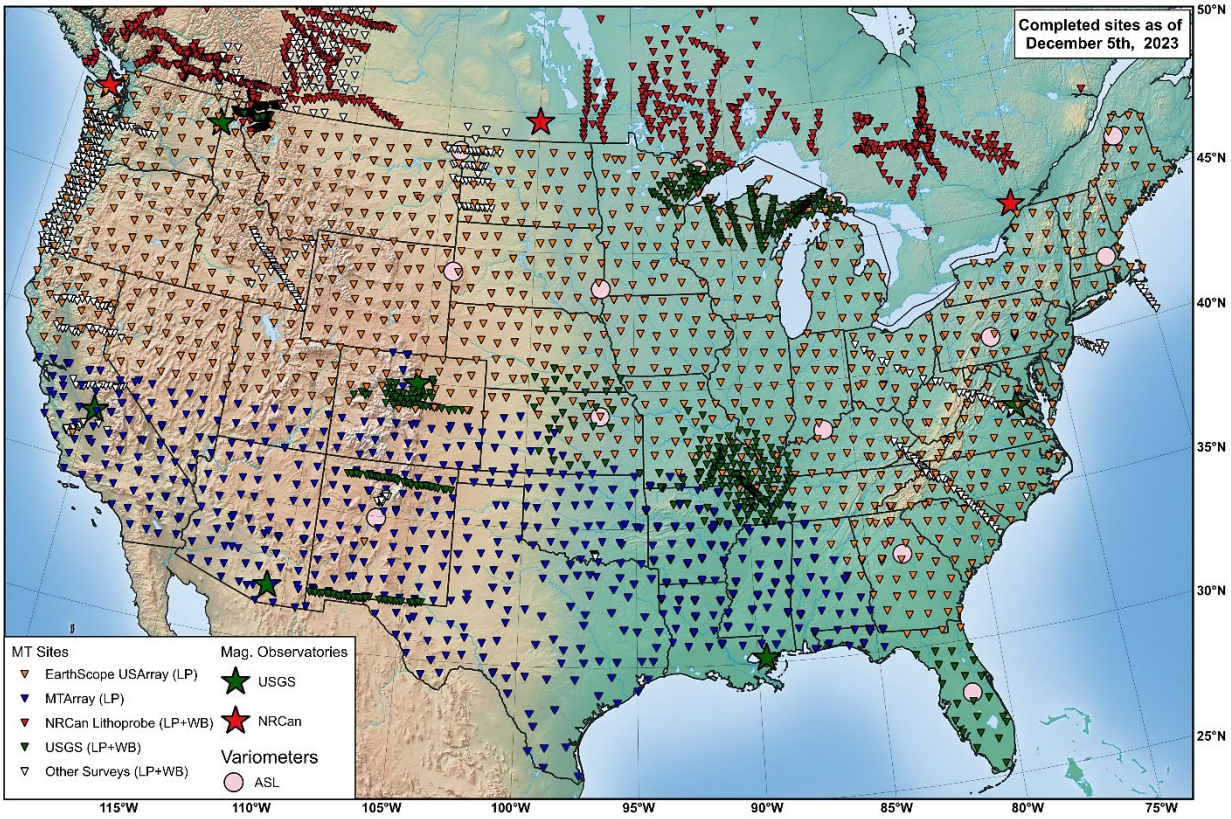
The graphic above describes the role of the Geomagnetism Program. Source: USGS.

Domestically, the USGS continues to operate 14 geomagnetic observatories (six within CONUS), delivering data and working cooperatively with the NOAA Space Weather Prediction Center (SWPC), the U.S. Air Force 557th Weather Wing, and numerous other customers and Federal agencies. For example, USGS observatory data are used by NOAA's SWPC, and by the U.S. Air Force, for issuing geomagnetic warnings and forecasts. The Geomagnetism Program also operates about a dozen lower-quality variometer geomagnetic stations, co-located with USGS earthquake hazards program monitoring sites. USGS geomagnetism research is conducted in collaboration with the Colorado School of Mines, the NOAA SWPC, and the NASA Community Coordinated Modeling Center.

Global USGS Magnetic Observatory locations. Source: USGS

The USGS also works with private entities that are affected by space weather and geomagnetic activity, including electric-power grid companies and the oil and gas drilling industries. In the oil and gas industry, for example, drill operators need to know the exact direction that their drill bits are going to maximize oil production and avoid collisions with other wells. One way to accomplish this is to install a magnetometer—a sort of modern-day "compass"—in a drill-string instrument package that follows the drill bit. Simultaneous measurements of the magnetic field in the drill hole are combined with those monitored by the USGS to produce a highly accurate estimate of the drill bit position and direction.

The USGS works with NOAA SWPC to produce hazard maps of the induced electric field in the crust due to geomagnetic storms. This work is part of a National Science and Technology Council's interagency working group for coordinating Space Weather Operations Research and Mitigation. These results, now incorporated into a real time product, will help power-grid companies improve the resilience of their systems to magnetic storms, as required by the Federal Energy Regulatory Commission. Power grid operators will use these results to design mitigation strategies for geomagnetic storms, and the space weather alerting agencies will use the resulting electric field model to issue improved forecasts and nowcasts for space weather alerts.



The USGS Geomagnetism Program awarded a second Cooperative Agreement with Oregon State University on June 1, 2022, for the third and fourth years of a project to survey a large, contiguous sector of the southern conterminous U.S. This figure represents the status of the survey as of December 2023. Once finished, this project will complete the MT survey across the contiguous United States. The upper two thirds of the CONUS MT Survey were completed through the NSF-funded IRIS Earthscope project from 2006-2018. In Fiscal Year 2022, the Geomagnetism Program also began receiving funds to expand its geomagnetic observatory footprint in CONUS. The pink circles in this figure represent the variometers - lower-quality sensors that complement the existing high-quality observatory locations - that have been added at USGS EHP seismic station locations managed by the Albuquerque Seismological Laboratory (ASL) to date. Source: USGS

The Geomagnetism Program will continue magnetotelluric (MT) survey efforts, building upon a national survey of the conterminous United States. This work targets improving U.S. electrical grid resilience, improving forecast models for geomagnetic storms, and aids in mineral resource assessments. FY 2025 efforts will focus on areas of highest geoelectric hazard identified in the National survey. Collection of this MT data is critical for modeling the Earth's electric field, used to assess the impact of electrical storms. This work is responsive to priorities established in the National Space Weather Strategy and Action Plan, as well as related international initiatives for pursuing induction hazard research. This broad collaboration includes scientists from NASA, NOAA, the Institute for Defense Analyses, the Federal Energy Regulatory Commission, FEMA, and NSF.

Natural Hazards
Coastal/Marine Hazards and Resources Program

Natural Hazards $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Coastal/Marine Hazards and Resources Program	**43,149**	**43,149**	**+1,106**	**0**	**+4,919**	**49,174**	**+6,025**
R&D Informing Climate-Related Risk Assessments	[0]	[0]	[0]	[0]	+2,800	[2,800]	[+2,800]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+2,119	[2,119]	[+2,119]
FTE	***202***	***202***	***0***	***0***	***+4***	***206***	***+4***

Justification of 2024 Program Changes

The 2025 budget request for the Coastal/Marine Hazards and Resources Program (CMHRP) is $49,174,000 and 206 FTE, a program change of +$4,919,000 and +4 FTE from the 2024 CR.

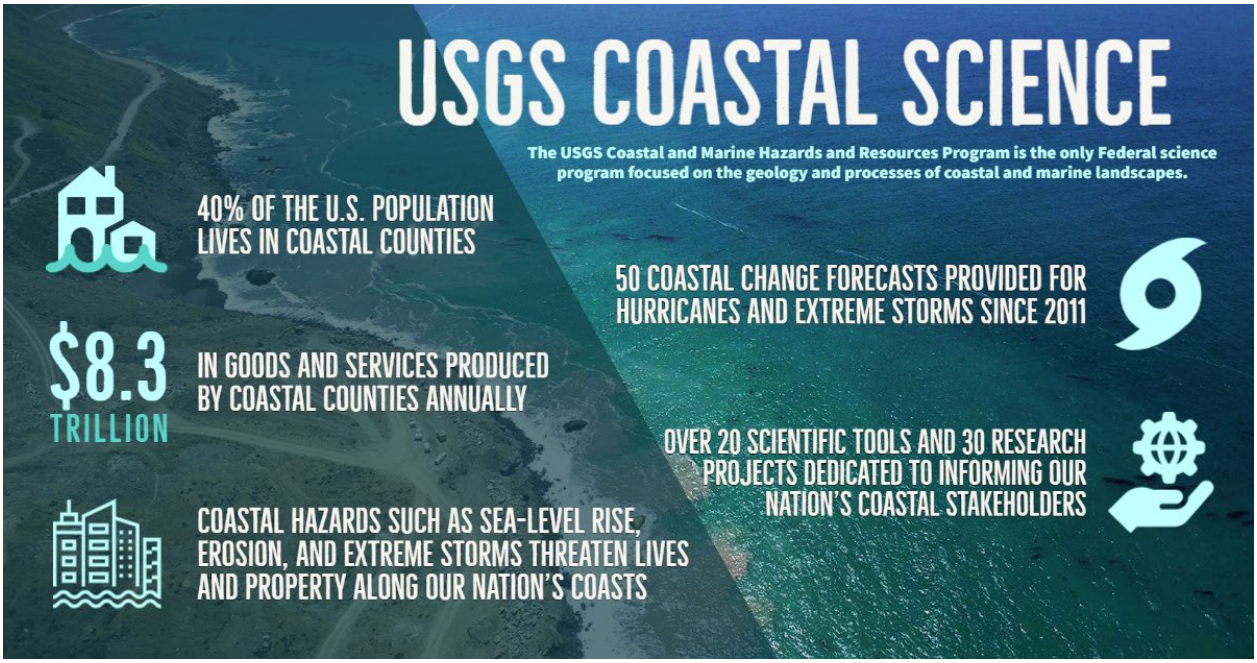
R&D Informing Climate-Related Risk Assessments (+$2,800,000 / +4 FTE) – The proposed increase would advance the modeling of physical processes to support the evaluation of the financial impacts of climate-related coastal hazards, such as erosion during extreme storms and inundation due to high water levels. This research supports efforts required by Sections 6(b) and 6(c) of Executive Order 14030, which directs the Federal government to assess and reduce exposure to climate-related financial risk. Models of the interactions between physical drivers and coastal landscapes in diverse environments (e.g., wetlands, barrier islands, coral fronted coasts) provide scientific information about the long-term response of U.S. coastal areas to future climates that are expected to bring more intense storms, including higher storm surge and increased sea levels. The USGS, working with other Federal agencies, such as FEMA, will explore the inclusion of these physical process models in the climate-informed scientific approach developed for the Federal Flood Risk Management Standard, as well as for tools designed to identify vulnerable areas. The application of models, developed with an understanding of the needs of coastal communities, will result in improved scientific information to guide decisions and assess climate-related financial impacts for a wide array of users at Federal, State and local levels, related to reducing future risk and building resilience.

Baseline Capacity - 2024 Fixed Costs (+$2,119,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $2,119,000 in the Coastal/Marine Hazards and Resources Program which reflects the incremental amount needed to cover the fixed costs associated with mission

operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

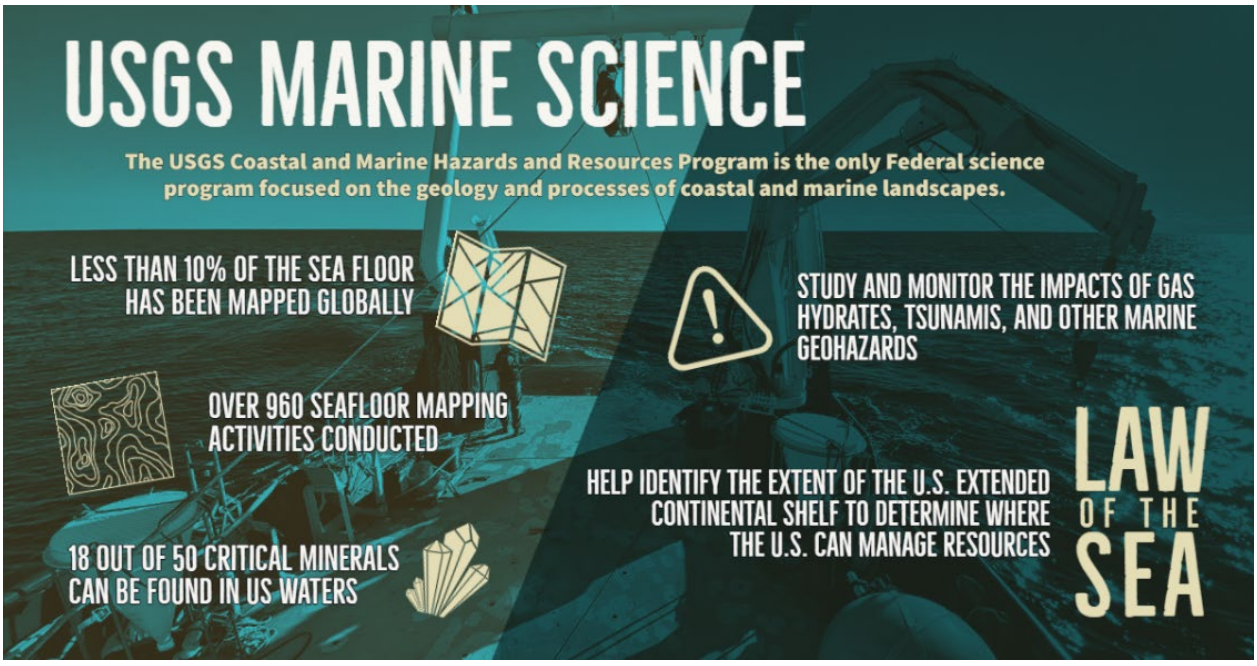
The CMHRP, the only Federal science program focused on the geology and processes of coastal and marine landscapes, provides scientific information, applications, and tools to support evolving challenges related to public safety, development, economic growth, and resource management from the deep sea to estuarine and coastal environments, where 40% of the population lives and works. USGS unique capabilities and expertise address the Nation's needs for coastal and marine science-based products on a



The graphic above describes the role of the Coastal/Marine Hazards and Resources Program as it relates to the science of coastal hazards and change. Source: USGS

national scale by supporting the priorities and objectives of the Administration, Interior and other Federal agencies. The CMHRP, primarily through three science centers across the country, responds to the immediate and longer-term needs and specific challenges of local and regional groups, ensuring that products are meeting and serving the needs of the public. In FY 2025, the CMHRP projects will strategically focus on building capacity to more effectively deliver accessible and useful information that helps Federal partners, local officials, resource managers, emergency personnel, and other ocean and coastal stakeholders. These efforts will reduce risk, protect resources, restore habitats, and plan responsibly for future change. Coastal changes due to storms, changes in sediment supply, and human alterations pose substantial risk to communities across the Nation, especially when combined with threats induced by climate change, such as more intense hurricanes and rising sea levels. USGS is the recognized Federal provider of tools to anticipate and respond to physical change along our Nation's coasts and the consequences of climate and coastal change on communities, infrastructure, and resources. USGS operational, real-time forecasts of erosion and inundation for all weather conditions, including coastal storms and hurricanes, provide the public with reliable, nationally consistent guidance on pending threats to coastal communities. To address needs related to long term planning for resilient coasts, USGS

scientists assess past changes such as land loss, erosion, and flooding, and develop projections of future changes due to extreme storms and sea level rise that result from climate changes, as well as impacts on coastal environments and communities. In FY 2025, the CMHRP will expand national and regional forecasts for changes from near-term severe storm events that highlight challenges such as coastal subsidence, threatened natural resource areas, and health and safety for coastal communities. Through scientific studies and assessments that describe and quantify the value of natural capital in providing coastal protection – for example, the role of coral reefs in reducing risks to coastal communities and the capacity of coastal wetlands to serve as sinks for atmospheric carbon – the USGS supports efforts to protect the Nation's people, environment, and infrastructure from short- and long-term coastal hazards.



The graphic above describes the role of the Coastal/Marine Hazards and Resources Program as it relates to marine science. Source: USGS.

USGS assessments of marine environments and potential geohazards – such as submarine earthquakes, landslides, and tsunamis – provide critical information that helps users identify and prepare for future hazards as well as reduce risk to offshore operations, coastal communities, and infrastructure. Surveys of geologic settings and processes increase scientific understanding used to inform development of offshore energy, critical mineral resources, and renewable energy efforts. This includes assessments of the distribution, composition, and environmental setting and resource potential of seafloor minerals, as well as associated environmental impacts of extraction. Additionally, the CMHRP supports the work to characterize marine methane systems and associated seabed processes to understand their energy resource potential, identify risks to offshore activities, and characterize their role in the global carbon system and marine ecological productivity.

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Water Resources

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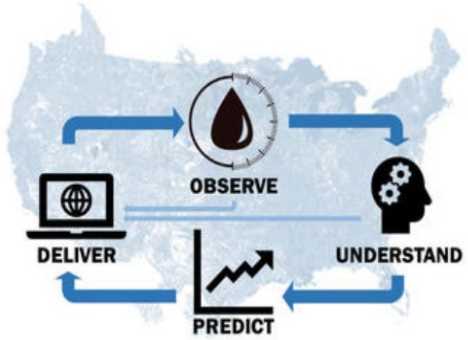
Water Resources

Water Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Water Availability and Use Science Program	**74,296**	**74,296**	**+1,193**	**0**	**+6,523**	**82,012**	**+7,716**
FTE	***313***	***313***	***0***	***0***	***+44***	***357***	***+44***
Groundwater and Streamflow Information Program	**114,558**	**114,558**	**+1,878**	**0**	**+4,954**	**121,390**	**+6,832**
FTE	***483***	***483***	***0***	***0***	***+10***	***493***	***+10***
National Water Quality Program	**100,080**	**100,080**	**+1,786**	**0**	**+4,286**	**106,152**	**+6,072**
FTE	***467***	***467***	***0***	***0***	***+8***	***475***	***+8***
Water Resources Research Act Program	**15,500**	**15,500**	**+0**	**0**	**-15,500**	**0**	**-15,500**
FTE	***2***	***2***	***0***	***0***	***-2***	***0***	***-2***
Water Resources Total	**304,434**	**304,434**	**+4,857**	**0**	**+263**	**309,554**	**+5,120**
FTE	***1,265***	***1,265***	***0***	***0***	***+60***	***1,325***	***+60***

The 2025 budget request for the Water Resources Mission Area is $309,554,000 and 1,325 FTE, a program change of +$263,000 and +60 FTE from the FY 2024 CR.



The above science processes (observe, understand, predict, and deliver) are necessary for acquiring reliable and actionable information about water availability. If one is overlooked, the others are limited. For example, if observing systems are not advanced, understanding is limited as is the ability to build better models for prediction. This is why science integration is critical and why it is a priority at the USGS.

Mission Area Overview

Water information is fundamental to national and local economic well-being, protection of life and property, and effective management of the Nation's water resources.

Beginning in 1888 with the National Streamgaging Program on the Rio Grande under the direction of John Wesley Powell, the USGS has become one of the largest providers of *in situ* water data in the world. The Water Resources Mission Area (WMA) works with partners to monitor, assess, conduct targeted research, and deliver information on a wide range of water resources and conditions including streamflow, groundwater, water quality, and water use and availability. These activities support an overarching science strategy to observe, understand, predict, and deliver water science to the Nation.

As the Nation moves forward in the 21st century, the USGS is integrating its water science activities to better address the greatest water resource challenges. In addition to maintaining longstanding nationwide monitoring systems, the USGS is working to intensively monitor and study select Integrated Water Science (IWS) basins. Each IWS basin will be the focus of multiple water science efforts, including the Next Generation Water Observing System (NGWOS), Integrated Water Prediction (IWP) and Integrated Water Availability Assessments (IWAAs), delivering a complete science capability. Five basins have been selected thus far – the Delaware River Basin (DRB), the Upper Colorado River Basin (UCRB), the Illinois River Basin (ILRB), the Willamette River Basin (WRB), and the Trinity-San Jacinto River Basin (TSJRB). A sixth basin will be selected in FY 2025.

IWS basins are medium-sized watersheds (10,000-20,000 square miles) that represent a wide range of environmental, hydrologic, and landscape settings and human stressors of water resources to improve understanding of water availability across the Nation. In each basin, the USGS will be developing assessment and predictive methodologies and tools that can be applied beyond the basin to the larger surrounding region and, ultimately, the Nation. The USGS will deploy water science efforts like the NGWOS, IWP, and IWAAs to better understand and predict water challenges. For example, in the DRB, the USGS is studying issues such as the impact of the drought of record under current water supply and demand restrictions. In the UCRB, cold-region processes of snow, ice, and frozen soils are some of the priority issues being studied. In the ILRB, the relationship between an overabundance of nutrients (primarily nitrogen and phosphorus) and associated harmful algal blooms (HABs) is a focus of integrated water science efforts. In the WRB, the USGS will improve understanding of the variability in streamflow and water temperature to support the identification of when, where, and why surface water conditions sustain use by people and/or spring salmon. In the TSJRB, USGS work will focus on impacts of flooding and large-scale urbanization on water availability and societal welfare. Through integrated activities funded through the three WMA budget programs, the USGS will continue to serve society by providing tools that managers and policymakers can use to manage water resources to meet both human and environmental needs.

The FY 2025 budget makes targeted investments in these integrated activities. The WMA will focus on the following science priorities:

- ***Delivering IWAAs.*** These multi-extent, stakeholder-driven assessments support the National Modeled Water Atlas (NMWA), a delivery system for periodically updated predictions of water availability, integrating water quantity, quality, and use; indicators of socioeconomic demand; and impacts of climate-related stressors to forecast water availability for human and ecological needs. At the national scale, the USGS will continue work to deliver version 1b of the National Water Availability Assessment Report (National Report) by 2026. Version 1b will include historical trends; improve predictions of water quantity and quality for inclusion in the National Report; enhance models of water use for all 8 categories of use reported by USGS; and work to integrate these components with indicators of socioeconomic demand and impacts of drought and wildfire to forecast water availability at various timeframes. Regionally, the USGS will continue IWAA activities in the DRB, UCRB, ILRB, WRB, and TSJRB with a focus on an improved understanding of impacts related to drought, wildfire, and overabundance of nutrients, balancing human and ecosystem needs, and impacts of flooding and urbanization respectively.
- ***Advancing USGS water observing systems.*** The USGS will continue to operate and maintain the fully implemented NGWOS monitoring infrastructure in the DRB, UCRB, and ILRB. In addition,

the USGS will complete approximately 75 percent of initial implementation in the WRB and 30 percent in the TSJRB and will begin planning for NGWOS implementation in a sixth basin (to be selected in FY 2025). In addition, the USGS will continue to operate its National Streamgaging Network in cooperation with over 1,400 partners. As part of the Streamgaging Network, the USGS will support approximately 3,440 locations in the Federal Priority Streamgage Network, which provide long-term, real-time data at locations that serve various Federal agencies. The USGS will advance its water observing systems with the operation of a new Hydrologic Instrumentation Facility (HIF) on the University of Alabama campus. USGS HIF functions will relocate from the current location at NASA's Stennis Space Center in Mississippi to the new location at the University of Alabama – Tuscaloosa in June 2024. HIF 2.0 presents new and enhanced opportunities to test and develop next generation water observing instrumentation with universities, other Federal agencies, and the private sector.

- ***Building integrated water prediction capabilities.*** The USGS is developing a new water prediction framework that, using advanced science and technology, will integrate state-of-the art climate, weather, water observations, and models to assess and simulate the underlying factors that limit water availability for both human and ecological uses in FY 2025. Using traditional observational networks, as well as targeted NGWOS data collection efforts, the USGS will evaluate and co-design data collection strategies to support model improvement and advance multi-scale modeling capabilities that support delivery of integrated water availability assessments. To ensure models effectively represent ecosystem demands, prediction capacity will be expanded to account for the impacts of hydrologic change on ecosystem vulnerability and resilience, including on culturally significant aquatic species that provide ecosystem services to underserved and vulnerable communities. Work will be accomplished through collaborations with Federal and local partners and academia.
- ***Modernizing USGS water data infrastructure***. The National Water Information System (NWIS) is the USGS enterprise system supporting the storage, processing, and delivery of real-time and historic water data. To ensure NWIS can manage current and new data produced by all WMA activities into the future, integrate water data from multiple agencies and sectors, and continue to deliver data and model results to the public, funding from across the WMA programs is used to support activities to modernize NWIS IT infrastructure and data systems. In FY 2025, the USGS will complete its multi-year effort to modernize NWIS and prepare it for efficient operations into the future. Moving forward, the USGS will work to continuously improve NWIS and make sure it remains a modern system.

Cooperative Matching Funds

Much of WMA work with partners is supported by a unique subset of funds referred to as Cooperative Matching Funds (CMF). Required by law to be matched by at least a 1:1 ratio by State, local, or Tribal partners, CMF is matched by over 1,600 of these partners to monitor and assess water resources in every State and U.S. protectorate and territory. CMF are found in three of the four budget programs: Water Availability and Use Science; Groundwater and Streamflow Information; and National Water Quality. The FY 2025 budget requests $66,529,000 for CMF across these three programs, continuing funding at the FY 2024 CR level.

FY 2023 Selected Mission Area Accomplishments

- USGS collected hydrologic data in partnership with over 1,500 Federal, State, Tribal and local agencies at approximately 20,200 groundwater wells and over 11,800 streamgages. Real-time water-quality data were also collected at over 2,500 locations. These data are used for various activities, such as managing flood or water scarcity risk to humans, designing bridges and water-treatment plants, and supporting freshwater biodiversity conservation. USGS data are provided to the public via the NWIS: Web Interface. To improve the delivery of these data, the USGS released a Spanish-language version of the National Water Dashboard (NWD) to expand the reach of these critical water data. The NWD provides an intuitive interface for the public to access USGS water data as well as water data from other government agencies (e.g., live weather radar) that helps the public understand the water situation in their area.
- USGS developed the first version of the National Modeled Water Atlas (NMWA) in anticipation of public release at the end of FY 2024. The NMWA will provide routinely updated, online information on water availability in the United States. When fully implemented, the NMWA will deliver model-based estimates of supply versus demand over time and location, as well as estimates of the individual components of water supply and demand, including water quantity, quality, and use.
- USGS sampled and analyzed 1,712 discrete surface water-quality samples from 109 sites across the United States and provided public access to data from over 2,500 continuous real-time gages and millions of discrete water-quality samples via the NWIS: Web Interface. USGS also sampled and analyzed discrete water-quality samples from 262 groundwater wells in eight different aquifers. A data release of groundwater networks sampled in FY 2022 was published and the decadal groundwater-quality trend mapper was updated. This water-quality information provides a better understanding of the current status and trends of water-quality conditions in streams and aquifers across the Nation and the role that land use and land management activities play in driving those changes, as well as the importance of hydrologic and climatic factors in driving changes in water quality.
- USGS drafted the first National Water Availability Assessment report, a synthesis and interpretation of water availability nationwide, that provides understanding of the status and long-term trends in water quantity, quality, and use to help support water policy development and decision making.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

Water Resources
Water Availability and Use Science Program

Water Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Water Availability and Use Science Program	**74,296**	**74,296**	**+1,193**	**0**	**+6,523**	**82,012**	**+7,716**
Integrated Water Availability Assessments	[7,475]	[7,475]	[0]	[0]	+12,000	[19,475]	[+12,000]
Mississippi Alluvial Plain IWAA	[2,000]	[2,000]	[0]	[0]	-2,000	[0]	[-2,000]
OpenET	[3,500]	[3,500]	[0]	[0]	-3,000	[500]	[-3,000]
Hydrologic Science Talent Pipeline	[2,000]	[2,000]	[0]	[0]	-2,000	[0]	[-2,000]
Water Cycle Center	[5,000]	[5,000]	[0]	[0]	-5,000	[0]	[-5,000]
Actionable Science Tools for Drought Response	[0]	[0]	[0]	[0]	+4,000	[4,000]	[+4,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+2,523	[2,523]	[+2,523]
FTE	***313***	***313***	***0***	***0***	***+44***	***357***	***+44***

Justification of Program Changes

The 2025 budget request for Water Availability and Use Science Program is $82,012,000 and 357 FTE, a program change of +$6,523,000 and +44 FTE from the 2024 CR.

Integrated Water Availability Assessments (+$12,000,000 / +50 FTE) – With this increase, the USGS would expand capacities used to develop and deliver 5-year National Water Availability Assessment reports to present not only historic trends and current status of water availability, but also to incorporate future projections of water availability for human and ecological use, infrastructure, security, and economic optimization into the assessments. This increase would advance the 5-year reporting beyond the preliminary approaches to release a fully integrated assessment of the status, trends, and projections of water availability by 2030, which will be useful to water suppliers, environmental managers, and decision makers to support better and more efficient water management for economic growth, protection of aquatic ecosystems, agriculture, and energy production. This integrated assessment is the fully realized version of a national assessment as required of USGS by the SECURE Water Act of 2009 and cannot be completed on schedule without this increase.

Mi**ssissippi Alluvial Plain (MAP) IWAA (-$2,000,000 / -13 FTE)** – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

OpenET (-$3,000,000 / -6 FTE) – At this funding level, the USGS will continue to refine the OpenET approach in the existing footprint of the irrigated lands of the 17 western States in support of water use irrigation withdrawal models but will not expand OpenET capabilities nationally.

Hydrologic Science Talent Pipeline (-$2,000,000 / -1 FTE) – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

Water Cycle Center (-$5,000,000 / -6 FTE) – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

Actionable Science Tools for Drought Response (+$4,000,000 / +20 FTE) – Prolonged droughts, particularly in the West, are causing fundamental shifts in our Nation's lands and waters. Stakeholders, including the agriculture industry and Federal, State, and local governments and Tribes, have an immediate need for drought information, data, and tools tailored to their workflows to inform operational decisions and actions. The USGS is well positioned to develop, in conjunction with our partners, state-of-the-art tools and actionable science to inform near-term land and water management, while also providing science to help guide longer-term management planning and decision-making efforts, particularly for potential transformational shifts in ecosystems. The USGS will leverage investments made in FY 2024 and previously to work with Interior and Tribal managers to accelerate development of relevant and authoritative data, indicators, scenarios, and new visualization tools for drought assessment and drought response decisions that are tailored to existing agency workflows. Co-production of science and targeted training will continue to be key components of both operational and long-term planning science support. Co-production would include partner-guided products that reflect the scale at which decisions are made and convening and engaging with our partners at all stages of the product life.

Given the impacts of long-term drought in the West and emerging drought in other parts of the U.S., it is important for the USGS to leverage its diverse expertise and partner relationships to provide support to decision makers and stakeholders across the western landscape. The USGS has supported extensive partner engagement throughout the Colorado River Basin with science to identify and begin to address these top priorities: 1) Enhanced understanding of the cascading effects of drought on ecosystems and socioeconomic factors; 2) Creation of a Colorado River Basin Science Hub to improve partners' access to and findability of science, data, and tools; and, 3) Improved understanding of gains and losses of water as it moves through the basin from one Colorado River reservoir to another.

To address these priorities, the USGS, working with partners, will use advanced science and technology to deliver water predictions and drought risk assessment tools in support of management needs related to mitigating and responding to prolonged drought. The USGS will co-produce research with partners including BLM, USFWS, NPS, BOR, States, and non-governmental organizations to understand and quantify socioeconomic factors that drive and are driven by water issues in the Colorado River Basin. This would include water valuations, water use trade-offs, water balance with human and habitat dimensions, and assessment of management alternatives. Drought-driven risk assessments for water supply, wildfire, snowpack, soil moisture and habitat change, which are critical for managers to maintain robust ecosystems under projected

changes, will be a top priority. The predictions and assessments, along with other fundamental information on how drought drives physical, biological, and chemical landscape change will be used to evaluate: 1) watershed conditions on multiple-use public lands, 2) status of fish and wildlife species under various drought conditions, 3) drought impacts on agricultural production, rangeland management and food security, and 4) plans and investments for infrastructure, conservation, and restoration projects. Work will focus on the Colorado River Basin, and then extended to other areas as applicable.

Because drought is changing the way hydrological systems work, habitat suitability for fish and wildlife is also changing at a fine scale across broad regions of the country. Conservation decision makers at USFWS, BLM, NPS, BOEM, BOR, States, Tribes, and other agencies need to know how the survival of fish and wildlife is changing at multiple scales, including small watersheds that are often the first to experience drought impacts and where information is scarce. The USGS has the combination of hydrological, ecological, and modeling expertise to develop an interactive tool that will allow decision makers to explore the implications of drought for future species survival at the scale of decisions. This will improve decisions that affect habitat restoration, land conservation, and the fishery, sport fishing, and recreation industries by providing current and future species status metrics that incorporate impacts of changing weather conditions and unprecedented drought. Subsequent work will add new data layers and interactions including, allowing the user to explore water management scenarios.

Baseline Capacity - 2024 Fixed Costs (+$2,523,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $2,523,000 in the Water Availability and Use Science Program which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2025. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

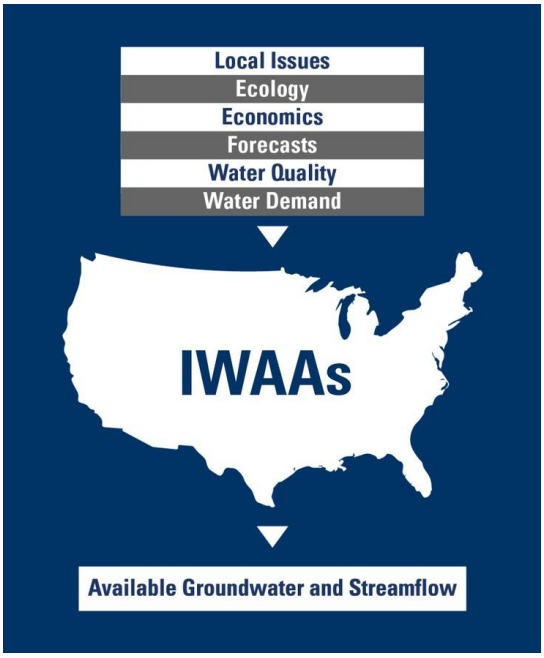
Program Overview

The Water Availability and Use Science Program (WAUSP) fulfills the requirements established by Congress in the SECURE Water Act (Public Law 111-11, Section 9508) by investing in research and assessments that improve the Nation’s understanding of water availability. Specifically, the WAUSP develops products and tools that will systematically provide information that will allow resource managers to assess the quantity and use of the Nation’s water. The WAUSP focuses on conducting national and regional water availability assessments; developing methods to estimate water budgets; and evaluating trends in water availability. In addition, the WAUSP supports efforts to develop techniques to evaluate water availability, advance the models and infrastructure that support assessments, and deliver tools that resource managers can use to support resource planning.

The National Water Census (NWC)

The goal of the USGS NWC is to provide nationally consistent, well-documented information on water quantity, quality, and use that will allow resource managers to assess the Nation’s water availability and inform decision-making. The USGS supports this goal by investing in efforts to assess and provide information on the inputs, the outputs, and changes in the water budget. Furthermore, the USGS is

examining the dynamic interactions and complex roles that major factors (i.e., water quality, drought, ecological flows, and water use) can have in water availability. Estimates of water budget components, as well as an understanding of how various factors can impact water availability, provide a means for the USGS to assess water availability.



When fully implemented, Integrated Water Availability Assessments (IWAAs) will evaluate current water supply and demand, long-term trends in water availability, provide seasonal to decadal forecasts of availability, and inform water resource decisions through development of socioeconomic tools. The IWAAs are designed to meet the goals of the National Water Census as established through the SECURE Water Act. Source: U.S. Geological Survey.

Integrated Water Availability Assessments (IWAAs): Critical to the development and delivery of the NWC are multi-extent stakeholder-driven assessments, referred to as IWAAs, that will provide periodically updated predictions of water availability for both human and ecological uses. At a national scale, the USGS is working to deliver two primary products: a web-based map that conveys daily snapshots of various water conditions and trends across the U.S. called the National Modeled Water Atlas (NMWA) and a regularly recurring 5-yr National Water Availability Assessment Report (National Report; see inset on next page). The WAUSP supports this effort by developing and refining models that use monitoring data to simulate water budget components and factors that influence water availability. The USGS is currently providing daily estimates for a variety of water budget components, including precipitation, streamflow, soil moisture, groundwater recharge, evapotranspiration, snowpack, snowmelt, and total runoff. Reporting for all eight major components related to water use will begin in FY 2026 when the USGS includes existing models of thermoelectric, irrigation, and public supply water withdrawals with the addition of models for industrial, mining, domestic self-supplied, aquaculture, and livestock water withdrawals. These water budget components will provide a foundation of data for the NMWA.

IWAA activities are also ongoing in each of the USGS IWS basins and in other targeted regions across the United States. The USGS is developing Regional IWAAs in partnership with stakeholders to ensure they are timely and informative at the local and regional level but can also be assimilated into national-scale products.

In FY 2025, Regional IWAAs will be ongoing in the DRB, UCRB, ILRB, WRB, and TSJRB basins. In the DRB, the USGS will work to complete phase 2 of the Regional IWAA by 2027, with a focus on understanding the impacts of drought on water availability and issues related to water temperature, salinity, and coastal hydrology (including coastal inundation). Efforts will also be ongoing to complete phase 1 in the UCRB in 2025 and the IRB in 2026 with a focus on improving water resource planning with advancements in understanding and prediction of the processes that influence the magnitude and timing of snowmelt (in the UCRB) and HABs (in the ILRB). In the WRB and TSJRB, the USGS will continue work on phase 1 of those Regional IWAAs aimed at better understanding how the timing, magnitude, and variation in water budget components influence water quantity and quality conditions. In

the WRB, focus is on understanding the variability of streamflow and water temperature and the drivers of that variability to determine the surface-water conditions that can sustain use by people and salmon. In the TSJRB, USGS efforts would be focused on impacts of flooding and large-scale urbanization on water availability and societal welfare.

Better Tools for the Public
The USGS National Integrated Water Availability Assessment Report

The SECURE Water Act (P.L. 111-11) recognized the need to improve our understanding of water availability for both human and ecological needs, across multiple sectors critical for economic growth and ecosystem sustainability. The ability to understand past and current water availability, as well as predict future water demands compared to available supplies is critical in the identification of emerging water issues, understanding the causes, and preparing for the future water availability. Integrating human water use and decision-making into models of the natural hydrologic system increases the ability of USGS to provide science-based information, including forecasts of water supply and suitability for use, to water resource managers, allowing them to make more informed management decisions. In 2024, the USGS delivered the first ever National Integrated Water Availability Assessment report, a periodic interpretive report on the state of the Nation's water resources—past, current, and future; quantity, quality, and use as well as the drivers of change including extreme events. This report will serve as a regular assessment of water availability for the Nation integrating the evaluation and prediction of water quantity, quality, and use, including ecosystem needs, into the assessment and communication of water availability. In 2025, USGS will build upon the release of the first National Water Availability Assessment report in FY 2024 with the publication of version 1b in 2026. Version 1b of the National Water Availability Assessment report will focus on past multidecadal changes in the components of water availability using both historical model predictions and observational trends.

The USGS will finalize a draft of the first ever National Integrated Water Availability Assessment report, a periodic interpretive report on the state of the Nation's water resources—past, current, and future; quantity, quality, and use as well as the drivers of change including extreme events. This report will serve as a regular assessment of water availability for the Nation integrating the evaluation and prediction of water quantity, quality, and use, including ecosystem needs, into the assessment and communication of water availability.

Water Use, Ecological Flows, and Drought: In order to fully deliver the NMWA, the USGS must develop the capacity to assess and understand not only the traditional hydrologic components of the water budget but also human and ecological supply and demand. By incorporating research and technical evolution, the USGS is focused on developing models that will improve water use reporting from 5-year annual reports (how USGS currently reports on water use) to daily estimates, modeled on a national scale. These daily estimates will include uncertainty to help resource managers assess model quality. The USGS will also identify, evaluate, and predict potential ecological responses to changes in water availability and forecast the onset, severity, and duration of hydrologic drought.

In FY 2025, the USGS will continue developing water use withdrawal models for industrial, domestic self-supplied, mining, aquaculture, and livestock uses accounting for the remaining 10% of water use nationally not already covered by USGS models, which allows USGS to report water use for all 8 categories of use; conducting ecological flow assessments and model development in the UCRB and the WRB; and, finalizing data-driven methods to prototype early warning of drought conditions nationally, including potential impacts to different components of water availability, including agricultural areas and ecological flows most vulnerable to drought.

Model Development, Infrastructure, and Information Delivery

Integrated Water Prediction (IWP): The USGS is participating in an ambitious Federal partnership with agencies like the National Oceanic and Atmospheric Administration, Bureau of Reclamation, and the U.S. Army Corps of Engineers to develop a new national, interagency capacity for water prediction. Working as part of this Federal community, the USGS is fostering a formalized, transparent, and adaptive governance process to integrate the modeling and computational strengths of multiple organizations.

Through identification of the science and technological needs that will serve the Nation's long-term hydrologic prediction capacity at the national, regional, watershed, and local scale, the USGS is developing the integrated modeling framework, software architecture, and standards needed to support robust, efficient, and sustainable integrated water prediction capabilities. In FY 2025, the USGS will continue working through an IWP program to develop nationally consistent approaches for predicting and forecasting water quantity and quality conditions, changes, and outcomes for water availability. Leveraging modeling approaches designed to consider water quantity, quality, and use together in an integrated water availability model framework, IWP tools will be used to support broader USGS goals, such as delivery of the National Modeled Water Atlas and National Integrated Water Availability Assessment report.

High-Impact Hydrologic Research

Research and development are critical to the effective management of the Nation's water challenges, providing a foundation for understanding how the hydrologic process works and impacts water availability. To this end, the WAUSP supports research to better understand how factors like socioeconomics and extreme events can impact water budgets, and, at a broader level, water availability. Through these efforts, the USGS strives to provide water resource managers with high-impact data, tools, and information that support management decisions.

Social and Economic Drivers: The USGS is working to better understand the impacts of and interactions between socioeconomics and water availability. A comprehensive understanding of the social and economic factors that drive water demand and alter water supply is needed to assess water availability in a predictive framework. Assessments and model development will identify the economic sectors, ecosystem goods and services, and other social, cultural, and economic factors that affect, or are affected by, water availability. In FY 2025, the USGS will continue efforts to incorporate socioeconomic drivers into water prediction and assessment capacity to better incorporate the impact of water demand, water management, and ecosystem services into national assessments. These efforts will improve the ability to forecast availability under a variety of conditions.

Water Budget Research: This research is focused on improving water availability prediction by better quantifying the hydrologic cycle. Activities at a range of spatial and temporal scales aim to improve the USGS's ability to evaluate all components of the water budget, including groundwater-surface water interactions, recharge, evapotranspiration, snowpack, soil moisture, and streamflow, and understand how changes to these components impact water availability. In FY 2025, the USGS will focus hydrologic process research on improving model representation of core IWAAS water budget components to reduce model uncertainty. This includes improving how models represent snow processes based on assessment and prediction of snowpack as a driver of water availability in the UCRB. It also includes understanding hydrologic influences on groundwater input to rivers and streams to improve representation of groundwater-surface water exchange.

Water Resources
Groundwater and Streamflow Information Program

Water Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Groundwater and Streamflow Information Program	**114,558**	**114,558**	**+1,878**	**0**	**+4,954**	**121,390**	**+6,832**
Federal Priority Streamgages	[25,715]	[25,715]	[0]	[0]	+4,600	[30,315]	[+4,600]
Hydrologic Science Talent Pipeline	[2,000]	[2,000]	[0]	[0]	-2,000	[0]	[-2,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+2,354	[2,354]	[+2,354]
FTE	***483***	***483***	***0***	***0***	***+10***	***493***	***+10***

Justification of Program Changes

The 2025 request for the Groundwater and Streamflow Information Program is $121,390,000 and 493 FTE, a program change of $4,954,000 and +10 FTE from the 2024 CR.

Federal Priority Streamgages (+$4,600,000 / +10 FTE) – Each year, floods, droughts, and water quality issues remind us of the vulnerability of our physical and socioeconomic well-being and the importance of monitoring our Nation's water. The Federal Priority Streamgage (FPS) network was designed to support long-term Federal information needs and operations, such as National Weather Service flood forecasting, reservoir management, and interstate and international compacts and decrees. In addition, the FPS network is intended to serve as a backbone within the USGS Streamgaging Network that is not vulnerable to changing local priorities and resources. This increase will allow the USGS to continue to operate the current FPS network of approximately 3,490 streamgages. In addition, the USGS would be able to support the installation of approximately 25 new or reactivated FPS sites to the network. Furthermore, the USGS would implement enhancements that increase the resiliency of the FPS network, such as hardening existing FPS sites.

Hydrologic Science Talent Pipeline (-$2,000,000 / -0 FTE) – The 2025 budget does not request funding for this program to allow the USGS to focus on higher priority research activities.

Baseline Capacity - 2024 Fixed Costs (+$2,354,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $2,354,000 in the Groundwater and Streamflow Information Program which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2025. This request in combination with the FY 2025 fixed costs

amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

The Groundwater and Streamflow Information Program (GWSIP) collects, manages, and disseminates high-quality and reliable water information in real-time and over the long-term. The information is critical for managing the Nation's water resources and anticipating and responding to water hazards that can result in loss of life and property. Serving as one of the largest water data holders in the world, the USGS partners with more than 1,500 Federal, regional, State, Tribal, and local agencies to maintain and manage its water monitoring networks. Furthermore, the GWSIP is increasingly monitoring both water-quality and quantity at a single location, providing continuous real-time water data used for decisions such as emergency response, flood forecasting, reservoir management, water-use restrictions, drinking water deliveries, permit compliance, water-quality studies, and recreational safety. The long-term data supplied by the program are a critical component to sustaining the viability of industries such as agriculture, fishing, and outdoor recreation, and are used for decisions related to water-supply planning, aquifer storage and recovery, infrastructure design, floodplain and ecosystem management, energy development, and resolution of water disputes.

National Water Census (NWC)

The goal of the USGS NWC is to provide nationally-consistent, well-documented information on water availability that will allow resource managers to assess the quantity, quality, and use of the Nation's water resources. The GWSIP is supporting this goal by collecting, analyzing, and assessing hydrologic data in transboundary rivers along the U.S-Canada border. Since 2019, the USGS has worked in Alaska, Washington, Idaho, and Montana to document baseline conditions and assess any potential impacts from mining activities in British Columbia. Work is being coordinated with various Federal, State, local, and Tribal agencies to ensure that USGS efforts will serve their needs for data and scientific understanding. In FY 2025, the USGS will operate continuous and discrete water-quality monitoring stations and conduct fish sampling at select locations on British Columbia transboundary rivers in Alaska, Washington, Idaho, and Montana, and utilize these data to conduct assessments of the potential impacts of mining activities on ecosystem health.

Observing Systems

Water monitoring networks are foundational in understanding the Nation's hydrologic systems; they provide information that is critical for defining, using, and managing water resources. The USGS operates a suite of real-time surface water and groundwater networks that provide data on water levels, streamflow, and a variety of water-quality parameters. The GWSIP primarily supports the networks that provide data on water quantity (water levels and streamflow), while also investing in next-generation water observing systems designed to integrate monitoring for water quantity, quality, and use.

National Streamgaging Network: The GWSIP supports the collection and delivery of streamflow or water-level information at more than 11,800 sites. More than 8,800 of these sites provide real-time streamflow information year-round and approximately 3,000 only record water level or operate less than year-round. The data are served online and form the basis for decisions related to protection of life and property from hazards, such as floods; cost-effective management of freshwater that is safe and available

for drinking, irrigation, energy, industry, recreation, and ecosystem health; and national, State, Tribal, and local economic well-being.

Federal Priority Streamgage (FPS) Network: The FPS Network (previously known as the National Streamflow Information Program) is a subset of the National Streamgaging Network and was conceived in 1999 to be a core, federally funded network. The original network design identified 4,300 sites that were strategically positioned across the country to address long-term Federal information needs, such as forecasting (primarily supporting National Weather Service flood forecasts and to trigger operational drought or emergency declarations), regulating interstate and international water compacts and decrees, and tracking sentinel trends. These sites are supported through a combination of USGS and local, State, and Federal partner funding—approximately one-quarter are fully funded by the USGS.

Anticipating the evolution of Federal stakeholder water-data needs and advances in monitoring and communication technologies in the 25 years since the network was initiated, USGS launched a re-evaluation of the fundamental priorities for the FPS network. In FY 2022 - 2023, the USGS solicited feedback from Federal agency stakeholders that benefit from the FPS network to understand how it can better serve their needs in the next decade. Based on this feedback, the USGS will propose modifications to the original network priorities and eligibility criteria along with corresponding revisions to the list of eligible FPS locations in FY 2024.

Improving Program Performance
Advancing USGS Monitoring Capabilities in Remote Areas through Satellite Remote Sensing

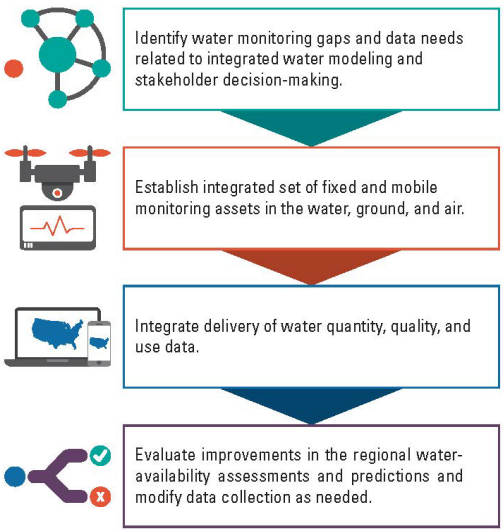
The USGS continues to expand delivery of real-time discharge data at remotely sensed stream monitoring locations across Alaska. Satellite observations enable stream monitoring in remote areas that are too difficult, dangerous, or expensive to measure with traditional on-the-ground methods, thereby expanding coverage of the national stream monitoring network. The USGS is currently testing and refining methods at 20 sites in Alaska using existing satellites to measure river widths, slopes, and altitudes at these locations and apply hydraulic equations to estimate discharge.

This initiative is expected to grow rapidly in 2024 beyond Alaska to other parts of the U.S. as the USGS works with NASA to leverage data from the new Surface Water Ocean Topography (SWOT) satellite mission. SWOT data are scheduled to become fully public in 2024 and will provide valuable hydrologic observations of lakes and rivers, including 90% of water bodies and 93,000 miles of river in the U.S. The USGS will ingest data from NASA, then correct and incorporate those data into the USGS remotely sensed gaging program to make the data easily accessible by the public. This work will expand spatial coverage of water monitoring and assessment across the Nation and inform regional and national water models and assessments.

National Groundwater Monitoring Network (NGWMN): The NGWMN was designed in 2009 in response to the SECURE Water Act (P.L. 111-11). Authorized as a collaborative groundwater network among intergovernmental agency data providers, the NGWMN provides access to water-level and/or water-quality data from more than 20,000 groundwater wells that are supported by over 45 Federal, State, local, and Tribal agencies. In FY 2024 and 2025, the USGS will invest in a necessary redesign of the NGWMN web portal to continue to deliver groundwater data to the public. As part of the NGWMN, the USGS supports 695 Climate Response Network (CRN) sites, representing 292 of 370 Climate Divisions in the U.S. as outlined in P.L. 111-11. These sites are supported by a combination of USGS and partner funding. The primary purpose of these data is to track the response of groundwater systems to short- and long-term climate variations nationwide. The network serves as a critical measure of groundwater

conditions during drought and provides long-term groundwater level data. In FY 2025, the USGS will continue to support the CRN.

Next Generation Water Observing System (NGWOS): As part of efforts to modernize observing networks, the USGS has developed a strategy for implementing an NGWOS. The USGS has begun establishing advanced, intensive monitoring networks in medium-sized watersheds across the U.S., referred to as Integrated Water Science (IWS) basins. Selected watersheds are being instrumented to monitor water quantity, quality, and use with a mixture of monitoring equipment in the water, ground, and air. The goal of the system is to provide high temporal and spatial resolution data on streamflow, evapotranspiration, snowpack, soil moisture, water quality, groundwater/surface-water connections, stream velocity distribution, sediment transport, and water use. These data are intended to be coupled with advanced models, such as the National Water Model, and other modern modeling tools to lower prediction uncertainty as well as provide flood and drought forecasts; drive emergency- and water-management decision support systems; and address a variety of other water-resource questions in a given region. Further, the NGWOS will provide a foundational dataset as the USGS develops Integrated Water Availability Assessments.



Infographic of the NGWOS implementation process. The NGWOS is integrating fixed and mobile monitoring assets in the water, ground, and air, including innovative webcams and new ground- and space-based sensors. Partner and stakeholder needs are informing NGWOS design so that data helps them anticipate water shortages more accurately and react to water hazards more quickly. Source: USGS.

Thus far, the USGS has selected five IWS basins (DRB, UCRB, ILRB, WRB, and TSJRB) and NGWOS implementation is ongoing in the first four basins. The initial investment of NGWOS instrumentation in the **DRB** is complete and has mainly focused on enhanced monitoring of streamflow, temperature, and salinity to help address key water-resource issues such as: interbasin transfers to New York City in the upper basin; maintaining ecological flows and stream temperatures adequate to support blue ribbon trout fisheries in the upper and middle part of the basin; and saltwater intrusion for cities like Philadelphia in the lower basin. Full NGWOS build out in the **UCRB** is complete as well and is focused on monitoring of snow to streamflow, groundwater to streams, and real-time water-quality, and aims to help answer specific hydrologic questions important to stakeholders such as: What are the near-term and long-term risks of floods and droughts, and what scenarios change these risks? How long will drought recovery take? How much water is stored in seasonal snowpacks, and how will changes affect water supplies? How much does groundwater contribute to streamflow, or vice-versa? What is the quality of water and how will it change during wet/dry periods? Full NGWOS build out in the **ILRB**, is also complete and is focused on real-time monitoring of nutrient and sediment delivery, factors leading to the formation of harmful algal blooms (HABs), urban flood hydrology, and helping to answer specific hydrologic questions important to stakeholders such as: What are the near-term and long-term risks of floods and droughts, and what scenarios change these risks? What factors affect water availability in basins that possess a complex mixture of urban and agricultural land use? How do nutrient loads influence HABs? What are the best ways to monitor for water supply contaminants such as per- and poly-

fluoroalkyl substances (PFAS)? What are the best practices to inform Federal State, local, and Tribal agencies about sediment loads in watersheds to facilitate planning of dredging operations that maintain navigable waters?

In FY 2025, implementation in the **WRB** will continue with a focus on understanding the balance between human needs for water management (e.g., flood control, water supply, recreation) and the need to maintain ecological sustainability (particularly for salmon). In addition, implementation in the **TSJRB** will continue with a focus on better understanding impacts of flooding and large-scale urbanization on water availability and social welfare. Selection of the sixth IWS basin is planned to occur early in 2025.

Improving Program Performance
Augmenting USGS Real-time Monitoring Capabilities with Cameras

Through support from NGWOS, the USGS is expanding the network of river monitoring stations equipped with optical cameras streaming live feed and displaying river conditions continuously. The network is hosted under the Hydrologic Imagery Visualization and Information System (HIVIS) that is available at https://apps.usgs.gov/hivis/. The images currently are being used for qualitative determination of hydraulic conditions through a visual analysis of the received frames. However, the network of cameras holds an immense untapped potential to measure key river conditions, such as water-level, velocity, and streamflow, cost-effectively, reliably, remotely, and in real-time. The USGS is expanding the use of cameras at monitoring stations and working with academia to operationalize methods for optical measurement of hydrologic conditions, which could revolutionize the spatial and temporal resolution and manner by which water data is collected across the U.S. These data are useful to provide visual understanding of current conditions, particularly during flooding hazards and can provide quantitative data to help public officials assess flood damage, enhance flood forecasting models, and improve long-term planning for future water hazards.

The Hydrologic Instrumentation Facility (HIF) is the foundation of USGS water observing systems. The HIF provides quality-assured hydrologic instrumentation and data collection equipment, testing of in-service instruments, and evaluation of new technology and instrumentation, which are foundational for a national, high quality water observing system. In FY 2020 and 2021, the USGS received appropriations to construct a new HIF co-located with complementary academic and Federal partners. In late 2024, the USGS will complete construction of a new HIF on the University of Alabama – Tuscaloosa campus. USGS HIF functions will be relocated from the current location at NASA's Stennis Space Center in Mississippi to the University of Alabama - Tuscaloosa. All HIF employees located in Mississippi will be given the opportunity to relocate with their positions. The HIF 2.0 will present new and enhanced opportunities to test and develop next generation water observing instrumentation with universities, other Federal agencies, and the private sector.

Data Systems

National Water Information System (NWIS) Modernization: As the USGS moves its monitoring networks forward through initiatives like NGWOS, it is modernizing the enterprise system that supports water data transmission, storage, processing and delivery: NWIS. These efforts will ensure that NWIS can efficiently manage new data and data types, incorporate automated processing of hydrologic data, integrate water data from multiple agencies and sectors, and continue to deliver data to the public, but in new and more user-friendly formats. In FY 2025, the USGS will complete its multi-year effort to modernize NWIS and lay out a strategy for efficient operations into the future that will involve continuous improvements to maintain a modern system. Data users will directly benefit from continued

enhancement of the National Water Dashboard, adding new public search and data download functionality, and enhancing delivery of camera imagery and videos, geospatial information, and discrete groundwater data. In addition, the GWSIP is investing in activities to ensure that state-of-the-art tools are used to develop information and data visualizations that meet the decision-making needs of stakeholders.

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Water Resources
National Water Quality Program

Water Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
National Water Quality Program	**100,080**	**100,080**	**+1,786**	**0**	**+4,286**	**106,152**	**+6,072**
National Groundwater Quality Network	[3,699]	[3,699]	[0]	[0]	+1,250	[4,949]	[+1,250]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+3,036	[3,036]	[+3,036]
FTE	***467***	***467***	***0***	***0***	***+8***	***475***	***+8***

Justification of Program Changes

The 2025 OMB budget request for the National Water Quality Program is $106,152,000 and 475 FTE, a program change of +$4,286,000 and +8 FTE from the 2024 CR.

National Groundwater Quality Network (+$1,250,000 / +8 FTE) – The National Groundwater Quality Network is the only Federal program that monitors the status of the Nation's groundwater quality and reports on how these conditions are changing over time. The EPA and States use these data to help identify and prioritize contaminants that are suspected to be present in drinking water and for which there are not health-based standards set under the Safe Drinking Water Act for monitoring by public water utilities as part of the Unregulated Contaminant Monitoring Rule. This proposed increase would include: (1) sampling of long-term (years to decades) groundwater-quality trends networks, (2) continuous and discrete water-quality monitoring activities designed to evaluate short-term (days to years) changes in shallow groundwater, (3) sampling of public supply wells that pump from stream valley aquifers present in 20 states across the lower third of the conterminous United States, and (4) water-level measurements in the core groundwater-quality networks. Work on national-scale reports describing the occurrence of contaminants found at concentrations that exceed drinking water standards will continue. This increase will also advance the development of planned groundwater quality models by continuing the compilation of required ancillary data, estimation of the contributions of groundwater discharge to streamflow, and quantification of lag times between implementation of agricultural and urban management practices and documented change in the quality of groundwater discharging to streams and estuaries, uncertainty estimates, and visualization tools for displaying model results and predictions.

Baseline Capacity - 2024 Fixed Costs (+$3,036,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America and be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce and the must pay requirements needed to continue to fulfill the USGS mission. The budget includes $3,036,000 in the National Water Quality Program which reflects

the incremental amount needed to cover the fixed costs associated with mission operations in FY 2025. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet must pay requirements without impacting program activities.

Program Overview

To effectively manage the Nation's water resources, decisionmakers depend on information about what resources are available for various purposes, and whether the quality of those resources is sufficient. The National Water Quality Program (NWQP) supports the data collection, assessments, modeling, and research needed to assess the quality of freshwater resources. In particular, activities are focused on understanding the role that water quality plays in water availability. The long-term data, assessments, and models supported by the program are critical to sustaining the viability of industries such as agriculture, fishing, and outdoor recreation, and are used for decisions related to water-supply planning, aquifer storage and recovery, infrastructure design, floodplain and ecosystem management, energy development, and water dispute resolutions.

National Water Census (NWC)

The goal of the USGS NWC is to provide nationally consistent, well-documented information on water availability that will allow resource managers to assess the quantity, quality, and use of the Nation's water resources. The NWQP supports this goal by investing in efforts to evaluate the water-quality aspects of water availability. Given the cost of treating water for various uses (e.g., public supply, irrigation, energy development), water-quality is critical in understanding the availability of water for human and ecological purposes.

Integrated Water Availability Assessments (IWAAs): IWAAs will provide periodically updated predictions of water availability for both human and ecological uses at regional and national extents. As part of this effort, the NWQP is working to analyze trends and develop advanced techniques to account for water quality. At a national scale, the USGS is working to deliver two primary products: a web-based map that conveys daily snapshots of various water conditions and trends across the U.S. called the National Modeled Water Atlas (NMWA) and a regularly recurring 5-year National Water Availability Assessment Report. NWQP supports these products through efforts focused on developing water availability indicators related to water quality that will convey periodic snapshots of current conditions and national trends. Water-quality indicators will show water availability based on suitable uses and untreated quality (e.g., water may be available but must be treated before use in an industrial setting yet could be used untreated for mining). In addition, the USGS supports efforts to evaluate water-quality trends on a national scale. At regional scales, the NWQP is working to integrate water-quality assessment and evaluation capabilities into Regional IWAAs. These Regional IWAAs are being developed in partnership with stakeholders to ensure they are informative at local and regional levels but can also be assimilated into national-scale products as part of the National IWAA.

In FY 2025, Regional IWAAs will be ongoing in the DRB, UCRB, ILRB, WRB, and TSJRB basins. In the DRB, the USGS will work to complete phase 2 of the Regional IWAA by 2027, with a focus on understanding the impacts of drought on water availability and issues related to water temperature, salinity, and coastal hydrology (including coastal inundation). Efforts will also be ongoing to complete phase 1 in the UCRB in 2025 and IRB in 2026 with a focus on improving water resource planning with advancements in understanding and prediction of the processes that influence the magnitude and timing of

Water availability reflects the quantity, timing, quality, and use of water resources and is driven by the interactions of various factors. The primary factors that can drive water availability are climate change, economics, water quality, and human and ecological demand.

snowmelt (in the UCRB) and HABs (in the ILRB). In the WRB and TSJRB, the USGS will continue work on phase 1 of those Regional IWAAs aimed at better understanding how the timing, magnitude, and variation in water budget components influence water quantity and quality conditions. In the WRB, focus would be on understanding the variability of streamflow and water temperature and the drivers of that variability to determine the surface-water conditions that can sustain use by people and salmon. In the TSJRB, USGS efforts would be focused on better understanding the impacts of flooding and large-scale urbanization on water availability and societal welfare.

Ecological Flows: The USGS is working to develop the data, tools, and information water resource managers need to protect and restore stream health as it is affected by water use, severe weather, and changes to water quality. The results will be used to identify, evaluate, and predict potential ecological responses to changes in water availability. In 2023, the USGS began to integrate data from hydrologic, biogeochemical, and ecological studies to improve USGS capacity to model the impacts of hydrologic change on ecosystem vulnerability and resilience, including culturally significant aquatic species that provide ecosystem services to underserved and vulnerable communities. Leveraging the multi-disciplinary nature of the USGS, this work is being conducted in collaboration with the USGS Ecosystems Mission Area. The USGS is also applying new technologies in genomic analyses, bioinformatics, and machine learning to improve the accuracy and interpretability of indicators of ecological wellbeing. These efforts would be expanded in FY 2025 in support of including ecosystem vulnerability in version 2 of the National Water Availability Assessment report that will be published in 2030.

Water Prediction and Information Delivery/Data Systems

Integrated Water Prediction (IWP): As part of an ambitious Federal partnership, agencies such as the National Oceanic and Atmospheric Administration, Bureau of Reclamation, U.S. Army Corps of Engineers, and USGS are developing a new national, interagency capacity for water prediction. As part of this effort, the USGS is working to advance its water modeling capabilities through an IWP program that is focused on developing nationally consistent approaches for predicting hydrologic conditions, changes, and outcomes for water availability. These approaches are being designed to consider water quantity, quality, and use together in an integrated water availability model. While these activities are supported by both the NWQP and the Water Availability and Use Science Program, NWQP funding supports activities that focus on incorporating water-quality processes into water prediction for a holistic view of water availability.

In FY 2025, the USGS will continue testing and evaluating methods to predict surface and groundwater quality nationally. NWQP efforts will focus on multi-scale testing and evaluation of this framework, specifically on improving the process representation and prediction of key water quality drivers, such as surface water temperature, constituent transport, and nutrients and salinity in both groundwater and surface systems. These activities will be coordinated with other integrated water science activities, such as IWAAs and are major components of the National Water Availability Assessment.

High Impact Hydrologic Research

The USGS is investing in the research needed to better understand the water-quality factors that impact water availability. This work provides the foundation for providing models and tools for resource managers that can consider the quantity, quality, and use aspects of water availability as an interdependent system.

Water Quality Processes: These activities support the methods development and research that the USGS needs to quantify impacts of constituent fate and transport on changes in water-quality and how those changes impact water availability for both human and ecological uses. In FY 2025, the USGS will continue efforts to understand the processes that influence both existing and emerging water-quality challenges such as harmful algal blooms (HABs) and per- and poly-fluorinated compounds (PFAS). Specifically, methods development activities will focus on the ability to detect and quantify contaminants of interest and to understand linkages between biogeochemistry and fate and transport. This is a critical foundation for understanding the potential impacts that contaminants like HABs and PFAS can have on water availability. Additional research will focus on improving prediction capabilities for the constituents identified as priority issues by stakeholders in IWS basins, including sediment, salinity, selenium, carbon, and nutrient dynamics in both surface and groundwater systems.

Social and Economic Drivers: These activities focus on better understanding the impacts of and interactions between socioeconomics and water availability. A comprehensive understanding of the social and economic factors that drive water demand and alter water supply is needed to assess water availability in a predictive framework. Assessment and model development will identify the economic sectors, ecosystem goods and services, and other social, cultural, and economic factors that affect, or are affected by, water availability. When considering these factors, water quality is an integral driver in socioeconomic decisions related to water availability given its role in the suitability of water resources for use. For example, under drought conditions, water resources managers must weigh water demand with the intended uses (e.g., irrigation vs. public supply vs. mining) and the costs for the required treatment associated with each use. In FY 2025, the USGS will continue studies aimed at understanding interactions, such as how risk and vulnerability influence water demand, use, and movement regionally. These efforts will improve the ability to forecast availability under a variety of conditions.

Water Availability Impacts of Extreme Events: The NWQP is working to understand how extreme events impact water availability through short-term changes in the quality of resources accessible for use. The initial focus of research activities will be on the impact of wildfire and hurricanes on water availability. In FY 2025, the USGS will continue developing the capacity to predict wildfire impacts on water availability using a strategic, nationally consistent approach to quantify critical drivers of water-quality impairment. Improvements in measurement, assessment, and modeling techniques will allow USGS to produce near-real time predictions of wildfire impact for post-fire debris flows and water-availability impairment. These activities support the goals and strategies of the USGS Wildland Fire Strategic Plan released in February 2021. Additional efforts include developing a strategy for predicting short- and long-term water availability impacts of hurricanes.

Observing Systems

The USGS operates a suite of surface water and groundwater networks that provide real-time data on water levels, streamflow, and a variety of water-quality parameters such as dissolved oxygen, pH, specific conductance, and temperature, as well as discrete water-quality data on contaminants. The NWQP primarily supports the networks that provide data on water quality, while also investing in next-generation water observing systems designed to enhance and integrate monitoring for water quantity, quality, and use. This integration is increasingly important as the WMA works to improve the prediction skill of complex hydrologic and water-quality models and ultimately improve understanding of water-availability and stakeholder decision-making.

National Surface-Water Quality Network (NSWQN): The NSWQN is the only nationally designed, long-term monitoring network for tracking the quality of rivers and streams with consistent, comparable data collection and analytical methods at all sites. NSWQN data is primarily collected through discrete sampling at sites; however, a growing number of sites have sensors that provide continuous, real-time water-quality conditions. Through NGWOS, new sensors and instruments will be developed and implemented to measure more types of contaminants on a continuous basis and deliver information to users in real-time. In FY 2025, the USGS will continue monitoring at 100 sites in the NSWQN covering important environmental settings (e.g., small agricultural and urban watersheds, large inland and coastal rivers, and minimally disturbed reference watersheds).

Improving Program Performance
Advancing USGS Water-Quality Monitoring Capabilities using Satellite Remote Sensing

The USGS continues progress towards a goal of monitoring water quality in every waterbody in the Nation that is more than 100 meters wide. One of the primary datasets and methods completed so far include a method for identifying the type of algae present in waterbodies from hyperspectral satellite imagery. Algae are a common and necessary part of aquatic ecosystems, but excessive growth can harm water quality, and the presence of certain types of cyanobacteria can lead to toxic conditions. Tracking algal types from space allows waterbody managers to identify when the algal populations in lakes and reservoirs shift from benign algae to potentially harmful cyanobacteria and provides a tool to enhance early warning and protect public health. The USGS will continue to develop and integrate remote sensing in water-quality monitoring with a goal of producing continuously updated water-quality maps to augment in-person monitoring and extend monitoring data in space and time to unmonitored locations across the Nation.

National Groundwater Quality Monitoring Networks (NGWQMN): The USGS monitors groundwater quality conditions through an enterprise of more than 80 long-term networks across the U.S. These groundwater-quality monitoring networks track water quality conditions in principal aquifers across the U.S. Concentrations of constituents, such as arsenic, nitrate, metals, pesticides, volatile organic compounds, and PFAS, are compared to benchmarks established for the protection of human health. Users can access an online tool to see how concentrations of these constituents in groundwater are changing during decadal periods across the Nation. In FY 2025, the USGS will continue sampling through these networks.

National Atmospheric Deposition Program (NADP): The USGS monitors wet atmospheric deposition (chemical constituents deposited via snow, sleet, rain) in the United States through the interagency NADP. The USGS supports sites in the National Trends, Mercury Deposition, and Mercury Litterfall

networks, which provide long-term, high-quality data to support decisions related to sources of water-quality impairment, and watershed studies. In FY 2025, the USGS will continue to support monitoring through the NADP.

Water Resources
Water Resources Research Act Program

Water Resources $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Water Resources Research Act Program	**15,500**	**15,500**	**+0**	**0**	**-15,500**	**0**	**-15,500**
Water Resources Research Institutes	[15,500]	[15,500]	[0]	[0]	-15,500	[0]	[-15,500]
FTE	***2***	***2***	***0***	***0***	***-2***	***0***	***-2***

Justification of Program Changes

The 2025 budget request for Water Resources Research Act Program is $0 and 0 FTE, a program change of -$15,500,000 and -2 FTE from the 2024 CR.

Water Resources Research Institute Grants (-$15,500,000 / -2 FTE) – The 2025 budget does not request funding for this program. The Water Resources Research Act (WRRA) Program is a Federal-State partnership that promotes State, regional, and national water resources research coordination and student education and training, and is a mechanism for information and technology transfer (from the Water Resources Research Institutes to scientists, water managers, and the public). This reduction would end USGS involvement in coordination and administrative support for all grants to the Water Resource Research Institutes. The Institutes would still operate with State funding at a lower funding level.

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Core Science Systems

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Core Science Systems

Core Science Systems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
National Geospatial Program	**93,650**	**93,650**	**+1,065**	**0**	**-8,468**	**86,247**	**-7,403**
FTE	***212***	***212***	***0***	***0***	***+2***	***214***	***+2***
National Cooperative Geologic Mapping Program	**44,556**	**44,556**	**+665**	**0**	**+1,096**	**46,317**	**+1,761**
FTE	***136***	***136***	***0***	***0***	***+0***	***136***	***+0***
Science Synthesis, Analysis and Research Program	**30,480**	**30,480**	**+406**	**0**	**+5,766**	**36,652**	**+6,172**
FTE	***75***	***75***	***0***	***0***	***+8***	***83***	***+8***
National Land Imaging Program	**115,921**	**115,921**	**+811**	**0**	**+27,068**	**143,800**	**+27,879**
FTE	***166***	***166***	***0***	***0***	***+38***	***204***	***+38***
Core Science Systems Total	**284,607**	**284,607**	**+2,947**	**0**	**+25,462**	**313,016**	**+28,409**
FTE	***589***	***589***	***0***	***0***	***+48***	***637***	***+48***

The 2025 budget request for the Core Science Systems Mission Area is $313,016,000 and 637 FTE, a program change of +$25,462,000 and +48 FTE from the 2024 CR.

Mission Area Overview

The USGS is the Federal agency responsible for mapping the geologic, geographic, and land features of the United States. The USGS, through the Core Science Systems (CSS) Mission Area, conducts detailed surveys and distributes high-quality and highly accurate topographic, geologic, hydrographic, and biogeographic maps and remotely sensed data to the public. Mapping accuracy enabled by cutting-edge technologies allows precise planning for: recreational use on public lands; collaborative conservation with Interior partners; conservation and natural hazards resilience; critical mineral resource assessments; renewable energy development; transportation and pipeline infrastructure projects; urban planning and development; land change and flood prediction at regional, local, and neighborhood scales; emergency response; and hazards mitigation.

The physical structure of the Earth underpins all life on it. The precise maps and data products that the USGS delivers from its cutting-edge Earth surveys and explorations help the Nation better understand the planet and, ultimately, aid in every aspect of human society, from economic planning to natural disaster prediction and response to natural resources management. The CSS fulfills the USGS' role as the primary national civilian mapping agency, and is responsible for topographic and geologic mapping in support of Federal and State requirements, national geospatial coordination in support of Interior and the Federal

Geographic Data Committee; geospatial mapping and applications through the Civil Applications Committee; and satellite operations and remote sensing. In addition, the CSS provides:

- research, modeling, and analysis of land change science, in support of agriculture;
- biological occurrence data acquisition, in support of invasive species research;
- biological taxonomic analysis and interpretation, in support of natural resource management;
- computational analytics and synthesis and integration of USGS national data sets, in support of modeling and forecasting;
- data management, storage, accessibility and policy, in support of open science;
- preservation of geological, geophysical, and paleontological data, in support of critical minerals;
- management of the archive of geoscience samples, including rocks, fossils, sediments, and ice cores, in support of resource assessments; and
- management of the network of libraries in support of USGS Earth science research and evidence-based science.

The USGS, through CSS, manages the land imagery of the Nation to support economic development, land use management, environmental protection, and resilience to severe weather events. Additionally, the CSS houses the USGS Chief Data Officer with delegated authority from the Interior Chief Data Officer to support the lifecycle and manage the portfolio of data assets from their respective bureau or office, champion data inventory and dissemination, and engage with data users and evaluation units within the organization.

The USGS, through CSS, is the primary Federal steward of high-quality geospatial data and provides access to the public through The National Map, the Federal Geospatial Platform, the National Land Cover Database, the National Geologic Map Database, USGS Earth Explorer, the National Biogeographic Map, and the Protected Areas Database of the United States. The CSS also operates Landsat satellites and data systems necessary to understand, monitor, and detect changes that affect the Nation's natural and agricultural resources, economy, public safety and national security, and historical heritage.

FY 2023 Selected Mission Area Accomplishments

- The USGS completed Landsat Next Mission Key Decision Point A. Successful planning and continued collaboration with the National Aeronautics and Space Administration will continue the 50-year unbroken record of remotely sensed satellite imagery of the Earth.
- The USGS implemented the topoBuilder platform and OnDemand Topo product and successfully transitioned a pilot program for an entirely new mapping capability to an enduring public offering. The U.S. is now the only country providing free on-demand maps that allow a user to specify their own map center point and adjust details of the map to suit their needs, leveraging the best available data.
- The USGS funded 43 awards to State geological surveys through its STATEMAP component. These awards totaled just over $14.6 million, leveraging State funding to work on the geologic framework of areas vital to States.
- The USGS broadened access to and use of scientific computing resources to USGS and Departmental staff, enabling opportunities to expand research, increasing data analysis, and decreasing computational barriers across all domains and organizations in the USGS and the Department of the Interior.

- The USGS released the Registry of Scientific Collections (ReSciColl) with over 50 new collections registered since the portal's release.
- The USGS reached 94.7 percent of the Nation with 3D Elevation Program data available or in progress.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

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Core Science Systems
National Geospatial Program

Core Science Systems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
National Geospatial Program	**93,650**	**93,650**	**+1,065**	**0**	**-8,468**	**86,247**	**-7,403**
3D Elevation Program (3DEP)	[42,905]	[42,905]	[0]	[0]	-6,250	[36,655]	[-6,250]
Alaska Mapping and Map Modernization	[10,000]	[10,000]	[0]	[0]	-2,278	[7,722]	[-2,278]
3D National Topography Model (3DNTM)/3D Hydrography Component	[500]	[500]	[0]	[0]	+1,000	[1,500]	[+1,000]
Digital Surface Models	[3,000]	[3,000]	[0]	[0]	-3,000	[0]	[-3,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+2,060	[2,060]	[+2,060]
FTE	***212***	***212***	***0***	***0***	***+2***	***214***	***+2***

Justification of 2025 Program Changes

The 2025 budget request for the National Geospatial Program is $86,247,000 and 214 FTE, a program change of -$8,468,000 and +2 FTE from the 2024 CR.

3DEP Elevation Program (-$6,250,000 / -0 FTE) – The 3D Elevation Program (3DEP) acquires light detection and ranging (lidar) data to enhance landscape-scale, three-dimensional maps for the Nation. At this level of funding, the USGS would complete 3DEP national coverage in 2027. While this is two years slower than at the current funding level, mapping in most areas of the U.S. would continue at the same pace.

Alaska Mapping and Map Modernization (-$2,278,000 / -0 FTE) – The USGS would continue completion of the National Hydrography Dataset Plus High Resolution for Alaska but would not acquire targeted satellite imagery updates and high-resolution elevation data for landslide and flood-prone areas. Map modernization efforts for the State of Alaska would also be delayed.

3D National Topography Model (3DNTM)/ 3D Hydrography Component (+$1,000,000 / +2 FTE) – The USGS and the National Oceanic and Atmospheric Administration (NOAA) are collaborating towards a "3D Nation vision" for a continuous three-dimensional (3D) elevation surface layer, from the peaks of our mountains to the depths of our waters. The 3DNTM is the terrestrial portion of the vision, which would integrate and model the Nation's elevation and hydrography in 3D. The 3D Hydrography Program (3DHP), the hydrologic component of the 3DNTM initiative, would improve the ability to track information related to water as it moves through the water cycle by connecting surface-water features to data about wetlands, stormwater systems, and groundwater. Combining the hydrography and elevation data would improve the

accessibility of water-related data, improve geospatial analysis, and support critical applications. The 3DNTM would continue the next phase of building a modern elevation foundation and would accelerate Federal, State, Tribal, and underserved community access to the next generation of topographic and hydrographic data, products, and services. The 3DNTM's state-of-the-art data and services would empower communities to plan for infrastructure projects and facilitate improvement of local economies. 3DNTM data would enable communities to effectively respond to fire and drought challenges and natural hazards by providing foundational data to analyze flood risk; manage land and water resources; locate potential areas for clean energy deployment; and support the mapping of broadband signal propagation to help improve access for underserved and rural communities.

Digital Surface Models (-$3,000,000 / -0 FTE) – The USGS proposes to discontinue funding to produce digital surface models (DSM) in FY 2025. These funds were initially intended to produce an interim product for the USGS while 3DEP completed coverage in areas not covered by lidar acquisition. The interim products were of limited use for the 3DEP Program. By FY 2025, all of the DSM source data for remaining areas not acquired by 3DEP will have been acquired or would be in process for production. This reduction would have minimal impact on completing acquisition of the national 3DEP baseline or on USGS operations.

Baseline Capacity - 2024 Fixed Costs (+$2,060,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $2,060,000 in the National Geospatial Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed cost requirements amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

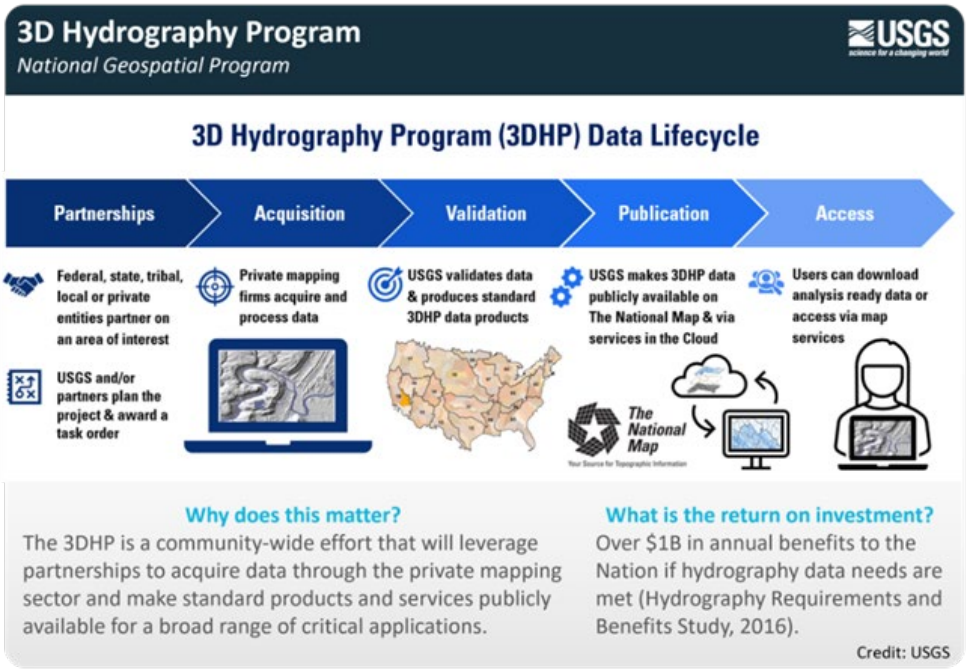
The National Geospatial Program (NGP) provides vital mapping information depicting the topography, natural landscape, and built environment of the United States. The USGS provides this information through The National Map, a compilation of nationwide topographic mapping products and geospatial datasets encompassing elevation, hydrography, structures, boundaries, and transportation data, including trails. These maps and datasets are used to advance science, enlighten citizens, and support decision-making and are employed by a broad variety of users ranging from government agencies and private businesses to the general public.

The USGS supports Interior's responsibilities for national geospatial coordination and carries out the USGS's government-wide leadership responsibilities for elevation, hydrography and watershed boundaries, structures, and geographic names. As one of the cornerstones of the USGS, The National Map has many uses ranging from recreation to scientific analysis to emergency response. The National Map is easily accessible and leveraged by users of all types including sophisticated commercial mapping platforms (e.g., ESRI, Google Maps), data analytics companies, all levels of government, universities, and the public. The National Map products and services allow users to enhance their recreational experiences, make life-saving decisions, and support scientific missions. The American people rely on the USGS' publicly available data and mapping to remain informed and to stay healthy and safe.

3D Elevation Program (3DEP) – By the end of FY 2023, the USGS achieved about 94 percent of the 3DEP goal to acquire the first-ever national baseline of consistent, high-resolution topographic elevation data, including both the bare Earth surface and 3D point clouds (representing the 3D positions of objects on the surface including buildings, vegetation, and the ground). 3DEP data directly support clean energy deployment, infrastructure, identification of undiscovered critical minerals, resilience to severe weather events, conservation, and Tribal programs. High accuracy 3DEP data are also used for determining broadband signal propagation routes to provide internet access to underserved communities.

A program plan for the next generation of 3DEP is nearing completion. That plan will outline a path forward on how the USGS will continue to work with partners to acquire improved lidar quality levels and more frequent refresh cycles, as well as integrate submerged elevation data of inland rivers (i.e., inland bathymetry) with terrestrial elevation data. The next generation of 3DEP will include development of the 3D Nation Ecosystem, a new data and tool sharing framework providing better access to USGS and partner elevation data.

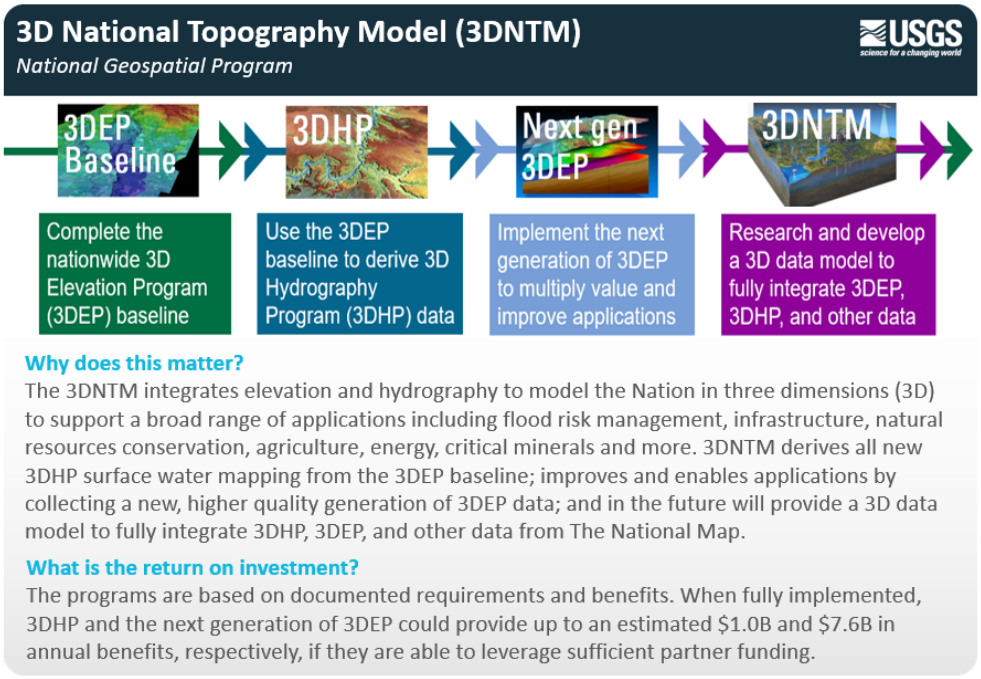
3D Hydrography Program (3DHP) –The USGS is leveraging the capacity and expertise of the private mapping sector to derive new, consistent hydrography (surface water features) from the 3DEP baseline elevation data. With this, the USGS can integrate the most current elevation and hydrography data for the first time in several decades, greatly increasing the utility of the data for engineering, science and emergency planning applications.



In FY 2023, the USGS completed development of the National Hydrography Dataset, Watershed Boundary Dataset, and NHDPlus High Resolution dataset. The most important features from these datasets were integrated into a new and streamlined 3DHP data model. The USGS also leveraged partnerships for new data acquisition to begin replacing old, outdated hydrography with new water features derived from the 3DEP elevation data. In addition to deriving new, more accurate water features like streams, waterbodies, and watersheds, the 3DHP delivers data in an interoperable data format that can be easily shared across Federal, State, local, Tribal, non-profit, private, and academic organizations. The

3DHP also includes improved methods and tools to describe water movement through the stream network (also known as navigation). This improved network navigation and tools will allow users to share and discover water-related data, such as distribution of aquatic species or streamflow information that is linked to the stream network. The 3DHP also will provide flow permanence (the reliability of streams having water or running dry) estimates based on observed streamflow data provided by the USGS Water Resources Mission Area. 3DHP data also supports watershed modeling and flood forecasting applications to better manage water resources and flood risk, as well as agricultural conservation planning, drinking water protection, and ecosystem management.

3D National Topography Model (3DNTM): The 3D National Topography Model (3DNTM) is a National initiative that integrates USGS 3DEP data and 3DHP data to model the entire U.S. in three dimensions (3D). This integration will result in updated, accurate, and more detailed elevation and hydrography information that will support a broad range of applications. The 3DNTM is the terrestrial component of the joint initiative called 3D Nation, with the National Oceanic and Atmospheric Administration leading the 3D Nation marine component. The 3D Nation vision is to provide a continuous elevation surface from the depths of our waters to the peaks of our mountains.



The 3DNTM improves and enables applications such as flood risk management, landslide hazards, debris flow modeling, infrastructure planning, precision agriculture, and others by collecting a new, higher quality generation of 3DEP data that also includes inland bathymetry data. Research is advancing development of a future 3D data model that will fully integrate 3DHP, 3DEP, and other data from The National Map. The 3DNTM is based on extensive user requirements and benefits documentation that was used to design its program components to maximize its return on investment to a broad range of business uses and applications. 3DNTM data would support national policies and initiatives including the Federal Emergency Management Agency (FEMA) Risk Rating 2.0, the Clean Water Act, the National Water Model, and the National Landslides Preparedness Act (P.L. 116-323).

Published Maps, Products, and Services – The USGS is the primary domestic civilian mapping agency, producing topographic maps for the Nation for more than 140 years. In addition to the standard digital US Topo map product, the USGS has embarked on a new paradigm of generating and delivering topographic maps called topoBuilder. The USGS has invested in a new cloud-based platform that enables users to request and receive custom, on-demand topographic maps. The USGS is the first and only Federal agency delivering this innovative capability to the public at no cost. The USGS released the first onDemand Topo map products in FY 2023 and will expand the topoBuilder product catalog in FY 2024 to include additional map products and additional customization options.

The Federal Geographic Data Committee (FGDC) is an interagency coordinating committee, which acts as the lead entity in the Executive Branch for the development, implementation, and review of policies, practices, and standards related to geospatial data. The FGDC provides coordination across all Federal agencies for delivering interoperable, accurate, and reliable geospatial data (e.g., maps and satellite imagery) that are foundational for understanding and interacting with the physical world. From managing built and natural resources to preparing for, responding to, and recovering from a natural disaster, geospatial data are essential for executing Federal business and supporting national priorities. The FGDC leads the development and operational decision making for the National Spatial Data Infrastructure (NSDI) by defining roles and responsibilities and promoting and guiding coordination among agencies of the Federal Government, State, Tribal, and local governments, institutions of higher education and the private sector. These efforts result in providing interoperable and reliable geospatial data, information, and knowledge from multiple levels of government and non-Federal entities to address local to national issues and priorities.

The FGDC implements the Geospatial Data Act of 2018 (GDA; P.L. 115-254; 43 USC Ch. 46) and cross-government and national geospatial initiatives, including the Geospatial Platform (GeoPlatform), the NSDI, and Federal geospatial data portfolio management practices. The FGDC coordinates with other interagency working groups, including the Federal Chief Data Officers Council, to integrate geospatial data with the broader Federal data enterprise; advance interoperability across geospatial, statistical, and other data types to increase value and use; and is responsible for actions in the Federal Data Strategy. The FGDC Office of the Secretariat provides executive, administrative, planning, and technical support to the Committee and to the National Geospatial Advisory Committee of non-Federal geospatial sector representatives, as directed by the GDA. The FGDC leads the development of the NSDI Strategic Plan, in accordance with the GDA and OMB Circular A-16 and supplemental guidance (*Coordination of Geographic Information and Related Spatial Data Activities*), to ensure geospatial data from multiple sources and geographic areas are available and easily accessible in and across sectors, and for public use.

The GDA directs covered agencies to include geospatial data in preparing the budget submission under sections 1105(a) and 1108 of Title 31 of the U.S. Code. Interior is a covered agency under the GDA, and the Office of the Chief Information Officer (OCIO) provides vision and leadership to Departmental offices and bureaus in all areas of information management and technology. The OCIO provides oversight and governance across Interior for geospatial programs and submits an annual Joint Certification Statement on geospatial data assets and major geospatial information technology investments, including the GeoPlatform, as a part of the Interior's Federal IT Acquisition Reform Act Joint Certification Statement in the President's Budget Request.

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Core Science Systems
National Cooperative Geologic Mapping Program

Core Science Systems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
National Cooperative Geologic Mapping Program	**44,556**	**44,556**	**+665**	**0**	**+1,096**	**46,317**	**+1,761**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,096	[1,096]	[+1,096]
FTE	***136***	***136***	***0***	***0***	***+0***	***136***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the National Cooperative Geologic Mapping Program is $46,317,000 and 136 FTE, a program change of +$1,096,000 and 0 FTE from the 2024 CR.

Baseline Capacity - 2024 Fixed Costs (+$1,096,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $1,096,000 in the National Cooperative Geologic Mapping Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

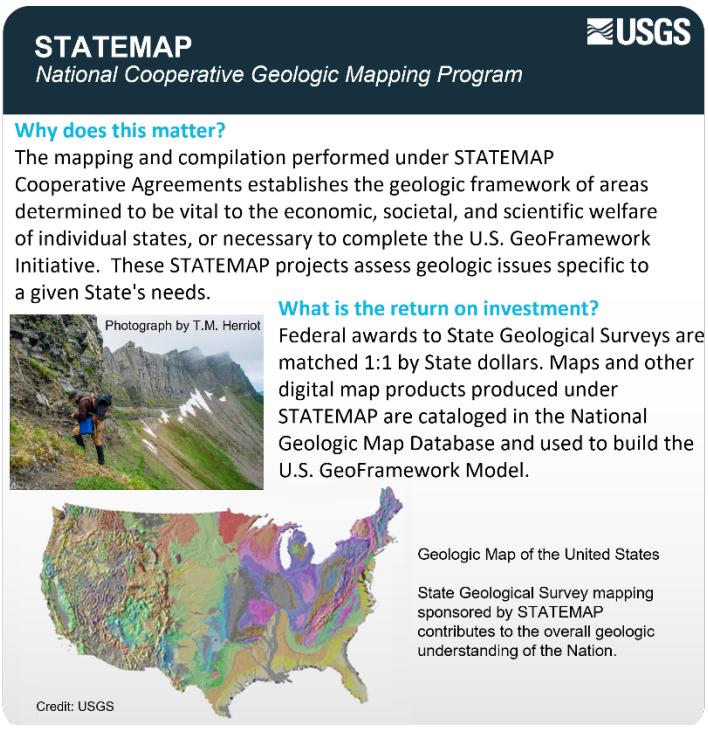
Program Overview

The USGS National Cooperative Geologic Mapping Program (NCGMP) conducts geologic investigations and produces geologic maps and national three-dimensional geologic framework models in collaboration with State Geological Surveys and university partners. A geologic map shows the distribution, type, and age of various rocks, soils, sediments, faults, folds, and other geologic features on the Earth's surface and subsurface using colors, lines, and symbols. The national geologic framework model is a three-dimensional visualization of surface and subsurface rock, soil, and sediment layers. This model informs the responsible use of land, water, energy, and mineral resources and addresses the Nation's rapidly changing natural resource needs. Federal and State decision-makers use the digital geologic maps and three-dimensional geologic framework models and visualizations to help mitigate natural hazards such as landslides; conduct energy and mineral resource assessments at local and regional scales; and assess hydrogeology (how water flows into and through the ground) and groundwater availability—all of which sustain and improve the quality of life and economic vitality of the Nation.

The Federal mapping component, or FEDMAP, supports research on the Earth's surface and subsurface geologic framework to solve critical societal and scientific problems.

The State mapping component, or STATEMAP, funds the geologic mapping studies conducted by approximately 44 State Geological Surveys through a competitive cooperative agreement program that matches every Federally provided dollar with a State-provided dollar.

The educational component, or EDMAP, funds competitive grants to universities and colleges for undergraduate and graduate students to conduct geologic mapping across the Nation in support of the Administration's priority for educating and training a 21st century workforce.



The National Geologic Map Database (NGMDB) serves as the authoritative, comprehensive, and publicly-available repository for the geologic maps and data produced by the NCGMP mapping components. The USGS manages the NGMDB in partnership with State geological surveys.

The USGS' substantial engagement with State governments supports mapping regions with high potential for strategic materials, including critical minerals, for the Nation's supply chain.

Core Science Systems
Science Synthesis, Analysis, and Research Program

Core Science Systems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Science Synthesis, Analysis and Research Program	**30,480**	**30,480**	**+406**	**0**	**+5,766**	**36,652**	**+6,172**
High-Performance Computing/ Supercomputing	[3,650]	[3,650]	[0]	[0]	+2,000	[5,650]	[+2,000]
The American Conservation and Stewardship Atlas	[0]	[0]	[0]	[0]	+2,500	[2,500]	[+2,500]
Conservation.gov	[0]	[0]	[0]	[0]	+500	[500]	[+500]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+766	[766]	[+766]
FTE	***75***	***75***	***0***	***0***	***+8***	***83***	***+8***

Justification of 2025 Program Changes

The 2025 budget request for the Science Synthesis, Analysis and Research Program is $36,652,000 and 83 FTE, a program change of +$5,766,000 and +8 FTE from the 2024 CR.

High-Performance Computing/Supercomputing (+$2,000,000 / +4 FTE) – The proposed increase supports a high-performance computing (HPC) initiative that would transform USGS science data delivery. Advanced scientific computing will help USGS advance fire and drought science delivery for resource managers, as described in the Ecosystems and Water Resources Mission Areas chapters. The USGS would continue to invest in scalable, on-demand operational HPC systems, including HPC cloud integration, large-scale integrated observational data storage and discovery platforms, edge computing, and modern artificial intelligence/machine learning architectures that would begin to provide timely, accurate Earth systems forecasting (drought, weather, land management, wildland fires, landslides, volcanos). For example, during the 2018 Kilauea volcanic eruption, USGS scientists used the HPC resources to reduce lava flow modeling time for analysis from 27 hours to 30 seconds, allowing emergency responders to provide more timely evacuation routes. The additional computational capacity would also reduce barriers between science production and user application.

American Conservation Stewardship Atlas (Atlas) (+$2,500,000 / +3 FTE) – The proposed increase supports the Atlas, a platform that would inform and foster collaboration among communities across America, deliver evidence-based information, and support planning for and assessment of land and natural resources. Conserving and restoring lands, waters, and nature requires locally-led, nationally-scaled efforts and high-quality information to strengthen decisions on prioritizing, implementing, and assessing land management outcomes. The Atlas would be a visual, interactive way to tell the story of land and nature in America. Through the Atlas,

Americans would see where stewardship activities occur, where natural resources and societal interests intersect, and where additional collaboration could make the greatest impact for local communities and conditions. The Atlas has extensive information technology and data curation requirements identified by the Federal government, States, and Tribes to support conservation progress in several settings, from protected lands to working lands. This request would sustain the Atlas by keeping it secure, reliable, evolving with new data, and responsive to stakeholder feedback. Resources are required to: 1) refine and improve the science foundation for the proposed conservation framework; 2) develop user-friendly analysis tools, dashboards, and stories; and 3) track progress towards conservation goals and depict current approaches to conservation.

Conservation.gov (+$500,000 / +1 FTE) – The proposed increase would strengthen collaborative, science-based conservation of public lands and waters by improving the web-based delivery of conservation data and information to stakeholders. Conservation.gov content, including data, maps, apps, conservation stories, press releases, images, and other resources, are housed within a dedicated cloud infrastructure allowing for collaboration in a secure environment. This request would help automate data curation and new content development.

Baseline Capacity - 2024 Fixed Costs (+$766,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $766,000 in the Science Synthesis, Analysis, and Research Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed the program to meet the must pay operational requirements without impacting program activities.

Program Overview

The Science Synthesis, Analysis and Research (SSAR) Program provides analysis and synthesis of scientific data and information, interdisciplinary research to improve understanding of Earth system changes, and preservation of scientific data and samples and library collections. This program strives to accelerate research and decision-making through data science, information delivery, advanced computing, biodiversity analytics, multi-hazard risk assessments, and preservation of geoscientific assets (e.g., rock cores) for reuse. The SSAR Program ensures that data are strategically managed, integrated, and easily available to decision makers and others as they focus on issues associated with Earth and life science processes.

The program includes the Science Analytics and Synthesis Program; National Geological and Geophysical Data Preservation Program; Geologic Materials Repository; J.W. Powell Center for Analysis and Synthesis; and USGS Library. Answers to today's science challenges are complex, multidisciplinary, and global in scope. Access to scientific data, samples, and literary resources is the foundation of scientific discovery. These assets require preservation, modernization, and documentation so that they are available for future research. The Nation has invested heavily in the initial acquisition of these scientific resources and the USGS is making these data and unique historical assets FAIR (Findable, Accessible, Interoperable, and Reusable).

The SSAR Program supports the Earth science community by offering interdisciplinary approaches, tools, biogeographic data and expertise; nurtures strategic partnerships; and leverages resources to advance scientific discovery. The SSAR program also provides the long-term management and public distribution of scientific resources and data that are collected, processed, analyzed, and reused by researchers who rely on the program's high-performance computing, enterprise data management, and historical research assets contained in the vast USGS scientific collections to address science challenges. USGS publications and science data are distributed and managed through a suite of enterprise data management applications such as the USGS Publications Warehouse and ScienceBase, a trusted digital repository. Scientists conduct complex analyses using advanced research computing capacity, including powerful supercomputers, large data transfer and storage, training, and expert consulting. Policymakers land conservation and resource management decision-makers, emergency responders and scientists rely on immediate access to this timely, well-curated, high-quality science to make well-informed decisions.

The USGS, other Interior bureaus, and State geological surveys manage a wealth of geological data and physical samples. The National Geological and Geophysical Data Preservation Program (NGGDPP) provides grants to State Geological Surveys, and funds projects in Interior's bureaus, to document, modernize, and archive these valuable and irreplaceable assets and make them available to the public. The NGGDPP has created the following websites that advance the FAIR-ness of historical data and samples, facilitating the reuse of these valuable resources. The ReSciColl - Registry of Scientific Collections is a catalog of scientific collections held by State geological surveys and USGS science centers, providing information about the collections and how to access them. The National Index of Borehole Information is a one-stop-web application for the discovery of and direct access to subsurface data and samples. Scientists use these samples for in subsurface modeling and characterization. The USGS Geological Materials Repository provides bureau-wide consultation, training, and repository services for the management of USGS scientific working collections. The USGS Library, authorized by Congress in 1879, is recognized as one of the world's largest Earth and natural science libraries. Each year, the USGS Library fills more than 2.5 million electronic information requests (journal subscriptions, website content, USGS Publications Warehouse visitors) and an estimated 10,000 service requests from USGS scientists and the public.

There is an imminent need to mitigate threats and foster resiliency to support conservation of America's lands, waters, and biodiversity. The SSAR program is engaged in interagency efforts to accelerate the application of scientific information in planning and decision-making. SSAR partners with natural resource managers to co-produce purpose-built tools such as the American Conservation and Stewardship Atlas, Protected Areas Database of the United States (PAD-US), National Fish Habitat Partnership, the Global Biodiversity Information Facility – US Node, and the Species of Greatest Conservation Need national database.

The SSAR Program also provides biogeographic data and science products to inform science-based management decisions. By employing expertise and resources in data management, high-performance computing, and visualization, the SSAR is working within the USGS, Interior, and with external partners to compile, synthesize, and analyze data representing species, their habitats, threats, and protections. These foundational data, methods, products, and capabilities contribute to the USGS vision of conducting national-scale assessments of the Nation's landscapes. Integration of these data provides the foundation for multi-hazard risk and vulnerability assessments and forecasting of ecological change.

Advanced Research Computing

Science Synthesis, Analysis, and Research

USGS science for a changing world

Why does this matter?

As researchers address increasingly complex scientific challenges, the need for High Performance Computing capacity grows. The USGS' Advanced Research Computing (ARC) helps USGS scientists' access and effectively utilize high performance computing resources.

USGS Hovenweep & Denali supercomputers

What is the return on investment?

High Performance Computing (HPC) advances USGS research analysis for Earth Systems science by accelerating research and decision making; decreasing scientists' wait-time for model results; and alleviating local IT infrastructure investments.

Lava Flow Modeling for Kilauea 2018

Modeling speed matters during emergency response!

Model runtime for evacuation routes reduced from 27 hours to 30 seconds with computational expertise and access to in-house HPC resources.

Photo Credits: U.S. Geological Survey

Core Science Systems
National Land Imaging Program

Core Science Systems $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
National Land Imaging Program	**115,921**	**115,921**	**+811**	**0**	**+27,068**	**143,800**	**+27,879**
Satellite Operations	**92,184**	**92,184**	**+276**	**0**	**+18,047**	**110,507**	**+18,323**
Sustainable Land Imaging Development-Landsat Next	[91,334]	[91,334]	[0]	[0]	+12,000	[103,334]	[+12,000]
Commercial Satellite Data Pilot	[0]	[0]	[0]	[0]	+5,000	[5,000]	[+5,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,047	[1,047]	[+1,047]
FTE	***86***	***86***	***0***	***0***	***+13***	***99***	***+13***
Science Research and Investigations	**23,737**	**23,737**	**+535**	**0**	**+9,021**	**33,293**	**+9,556**
Remote Sensing State Grants	[1,465]	[1,465]	[0]	[0]	-215	[1,250]	[-215]
Enhancing Landscape Measurements, Data, and Analysis	[0]	[0]	[0]	[0]	+3,700	[3,700]	[+3,700]
National Land Use Data Products	[0]	[0]	[0]	[0]	+1,500	[1,500]	[+1,500]
Natural Capital Accounting	[220]	[220]	[0]	[0]	+3,000	[3,220]	[+3,000]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+1,036	[1,036]	[+1,036]
FTE	***80***	***80***	***0***	***0***	***+25***	***105***	***+25***

Justification of 2025 Program Changes

The 2025 budget request for the National Land Imaging Program is $143,800,000 and 204 FTE, a program change of +$27,068,000 and +38 FTE from the 2024 CR.

Sustainable Land Imaging Development-Landsat Next (+$12,000,000 / +10 FTE) – This request ensures the USGS has sufficient funding for the joint agency DOI/National Aeronautics and Space Administration (NASA) Sustainable Land Imaging (SLI) program, including ground system development to support the launch and operation of Landsat Next and achieve the goals of the Sustainable Land Imaging Program. To ensure that sufficient funding is available to fund the peak development of the ground system, a $12.0 million increase is needed in FY 2025. Without this increase, the USGS would not be able to keep pace with Landsat Next development timelines while simultaneously operating the Landsat 8 and 9 satellites, collecting, archiving, and processing their data, and providing access to the users. Landsat Next would deliver far more capability than Landsat 8 and 9, meeting more agency and partner needs across the DOI and

Federal agencies with twice the number of spectral bands, better than twice the spatial resolution, and better repeat coverage than Landsat 8 and 9 combined. The new Landsat Next capabilities would dramatically improve Landsat data to make it more useful for science and operational applications for Federal, State, Tribal, and local governments, and industry including: monitoring fast-moving events such as crop growth and coastal change; natural hazards including wildfire; water use and water quality, and mineral mapping. With the aging Landsat 8 satellite in orbit, it is critical to support the development of Landsat Next now to ensure a continuous, consistent record of Earth surface changes**.**

Commercial Satellite Data Pilot (+$5,000,000 / +3 FTE) – This request would fund a pilot to better understand how acquiring commercial satellite data can help provide higher-resolution, full-spectral coverage, time-sensitive land imaging data and derivative products. The initiative would pilot various methods for acquiring products from commercial optical and radar satellites and upgrade the USGS infrastructure for accessing these data. Commercial optical satellite data can augment Landsat capabilities with nimble, high-resolution, targeted area data collection to monitor rapidly changing land conditions caused by floods, volcanic eruptions, and landslides. Commercial radar data could also enable improved monitoring of land subsidence, forest structure, and infrastructure changes. With this increase, the USGS would acquire data and products that are not readily available from existing mechanisms. Agency operational needs would be identified through a periodic request for information to Federal users. The USGS would follow NASA and the National Reconnaissance Office's best practices on purchasing commercial satellite data while evaluating commercial satellite vendors. This proposal ensures the USGS could successfully identify, evaluate, and access suitable commercial satellite data to augment the SLI program's products and services that need high-resolution optical, radar, and hyperspectral data. Advancing the use of commercial satellite data supports U.S. remote sensing space policies that seek to promote the use of U.S. commercial remote sensing satellite systems to the maximum practical extent.

Remote Sensing State Grants (-$215,000 / 0 FTE) – This request would reduce funding for the National Land Remote Sensing Education Outreach and Research Activity, a grant program focused on promoting the uses of space-based land remote sensing data with qualified educational institutions.

Enhancing Landscape Measurements, Data, and Analysis (+$3,700,000 / +11 FTE) – With this increase, the USGS would improve the measurement and monitoring of greenhouse gas (GHG) emissions from natural systems. In addition, the USGS would produce new land cover / land change products in support of GHG analyses.

Building on USGS expertise in wetland, aquatic, and coastal ecosystems as sources and sinks of greenhouse gases, the USGS would improve existing capabilities in the following areas:

(1) Organizing, standardizing, and calibrating existing data that would allow data users to update wetland GHG observations and emissions factors under different management conditions and climate impacts;
(2) Enhancing remote sensing and simulation modeling toolsets for monitoring coastal wetland GHG emissions and removals. These toolsets would allow users to identify impaired wetland

locations, land use and land management histories, and potential sites that would have the greatest anticipated benefits of restoration; and

(3) Adding monitoring equipment to existing USGS National Streamgage Network sites that would support measurements of GHG emissions from surface water (e.g., rivers, ponds and lakes) and other sources of the emissions. These emissions are estimated to be a significant offset to carbon removals by land; however, there is currently an inability to report on this important segment of GHG emissions.

Building on the USGS's flagship land change monitoring efforts, the USGS would produce annual land cover and change products extending the availability backwards to the 1980s. This would support monitoring of GHG emissions and climate impacts from natural systems that use baselines starting in the 1980s, combined with the annual update to capture emissions that occur in pulses. This monitoring baseline enables decision-makers to develop scenarios in an integrated modeling framework to simultaneously forecast future landscape change and inform mitigation strategies and land management planning.

National Land Use Data Products (+$1,500,000 / +4 FTE) – Nearly 80 percent of the Nation's land surface is directly or indirectly affected by human activities, yet there is not an up-to-date national-scale land use map product. Currently, land use products are at a local and regional scale. Building on its long-standing science research, product development, and expertise of flagship land cover datasets, the USGS would initiate the development of a new national-scale product summarizing land use in the United States. This national-scale land use product would close the knowledge gap by depicting the impacts that human decisions and activities have on landscapes. Through these efforts, the USGS would provide a comprehensive, wall-to-wall summary of U.S. land use at spatial scales coupled with thematic content to support natural capital accounting. Land use data products, combined with socioeconomic and environment change information in a modeling framework can enable forecasting future landscape conditions, risks, and vulnerabilities to support land management and biodiversity assessments, infrastructure development, natural capital accounting, and natural resource management and planning.

Adding to the foundational USGS national-scale land change monitoring product suite, the land use product will intersect land cover with data including: land management, recreational use, commercial and/or industrial use, and other socioeconomic data that describe and map human interactions with the landscape. The USGS will actively engage relevant stakeholders to ensure the land use product meets their needs. As relevant data layers are updated and new sources become available over time, the USGS will periodically update the land use product to reflect changes in land use and land management.

Natural Capital Accounting (+$3,000,000 / +10 FTE) – Environmental-economic accounts would enhance the Nation's statistical system by providing an improved understanding of the contributions of natural assets, like water and land, to economic activities, and allow for the measurement and monitoring of natural asset trends over time. The rigorous and objective data provided by the accounts would help government and private decision makers better understand economic dependencies on nature. The USGS would build on and augment existing datasets across mission areas that support environmental-economic accounts, adding value by increasing the data's use and useability. The USGS would also produce pilot environmental-economic accounts for land, water, natural hazards, energy and minerals, and ecosystems.

The USGS will be a primary contributor to the following pilot accounts: 1) water accounts that integrate USGS water availability data and models with national economic accounts; 2) natural hazard accounts that specify the contributions of ecosystems to hazard resilience and the impacts of hazards on the Nation's economy; 3) energy and mineral accounts that measure stocks and flows of these resources and their economic contributions; 4) land accounts that fully integrate the USGS land cover data with land use and value information; and 5) ecosystem accounts that measure the extent and condition of the Nation's ecosystem assets and their contributions to the U.S. economy. These pilot accounts will simultaneously provide: 1) proof-of-concept products leading to final, production-grade statistical products; and 2) information products that demonstrate the utility of incorporating environmental-economic accounts in decision making.

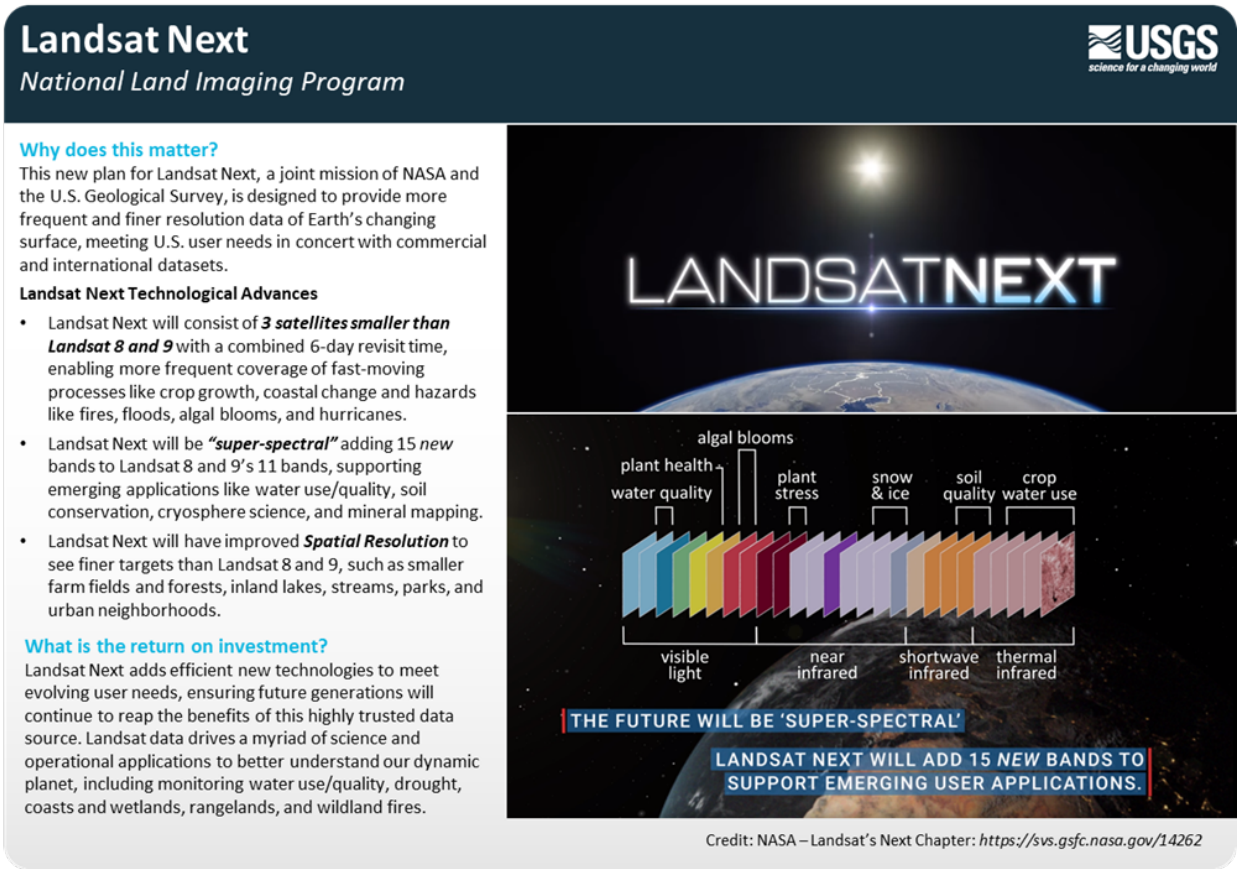
Baseline Capacity – 2024 Fixed Costs (+$2,083,000 / 0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $2,083,000 in the National Land Imaging Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed the program to meet the must pay operational requirements without impacting program activities.

Program Overview

Our Nation's economic security, environmental vitality, and ability to respond to the impacts of severe weather events rely on the USGS's continuous monitoring of the Earth's land surfaces, surface waters, and coastal regions. The USGS National Land Imaging (NLI) Program, through its USGS Earth Resources Observation and Science (EROS) Center in Sioux Falls, South Dakota, provides the world's largest civilian archive of remotely sensed Earth observations. This information empowers research and decision-making by land resource managers in all 50 States, Tribal lands, and U.S. territories.

The USGS is responsible for U.S. civil operational land surface observations through its Landsat satellite missions that are designed, launched, and operated in collaboration with NASA under both agencies' Sustainable Land Imaging (SLI) partnership. This interagency partnership ensures continued, long-term operational provision of global land surface, surface water, and coastal remote sensing data to U.S. citizens on a full, free, and open basis. Through EROS, the USGS operates the Landsat 7, Landsat 8, and Landsat 9 satellites, the world's longest operational civil satellites with simultaneous full spectrum coverage including visible, near- to short-wave and thermal and infrared sensors. The thermal and short-wave infrared sensors help to measure the Earth's surface temperature and detect differences in moisture content in soils and plants. These satellites provide continued, foundational Earth observations to hundreds of thousands of government, commercial, educational, and research users across the Nation. Landsat's unique 50-plus--year data record enables the Nation's users to record, study, understand, and better manage landscape change at local, regional, and global scales.

The USGS processes and distributes Landsat data and maintains the long-term Landsat data archive. Through its partnership with commercial cloud data services, the USGS is exponentially increasing the amount of Landsat data products accessed by users at no cost: from tens of millions to billions of accesses each year. Under the SLI partnership, NASA and the USGS have begun work on Landsat Next, the next generation of Landsat satellites. With its primary mission completed, the Landsat 7 mission, launched in 1999 with a 5-year life expectancy, is being maintained in a safekeeping mode as it awaits a NASA refueling demonstration in 2026. After this demonstration, Landsat 7 will be decommissioned. The Landsat 8 mission, launched in 2013, is continuing its primary science mission. The development of Landsat Next is essential to ensure data continuity with the 50-plus year Landsat data record.



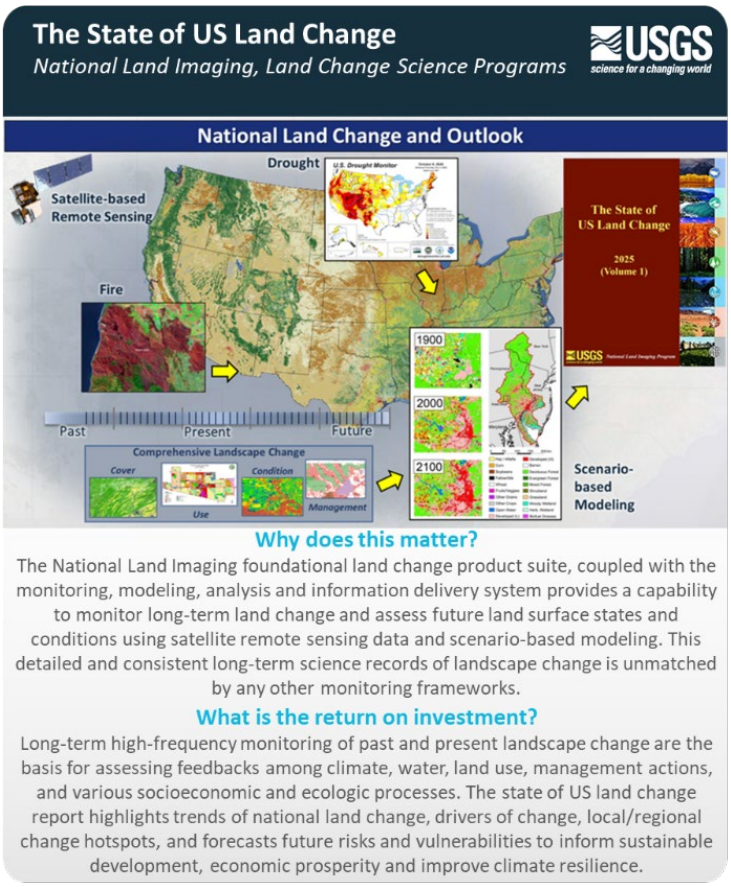
Credit: NASA – Landsat's Next Chapter: *https://svs.gsfc.nasa.gov/14262*

Landsat Next is the result of several years of joint planning by NASA and the USGS, resulting in a system of three smaller satellites launched into a lower orbit, and providing twice the number of spectral bands of today's Landsat satellites. Landsat Next will also provide more spatial details (10-20 meters versus 30 meters) and more frequent observations (every 6 days for Landsat Next versus every 16 days for Landsat 8 or 9) than previous Landsat satellites. These technological enhancements will provide users with improved performance to meet their documented needs for detecting and characterizing land surface change across the Earth (Wu et al., 2019). These needs include an improved ability to respond to increasing wildfire events, drought, HABs, and other effects of changing weather across the U.S. and around the world in the coming decades.

In addition to Landsat data, the USGS collects, processes, archives, and provides the Nation with digital land-surface image data acquired by numerous other satellite and airborne sensors, including uncrewed

aircraft systems (UAS). In the case of UAS, the NLI Program funds the USGS National Uncrewed Systems Office in Denver, Colorado, to enable the broad use of UAS technology across the USGS. UAS observations support multiple USGS science applications, including ecosystems monitoring and hazards assessments. These data can also complement Landsat observations to maximize user need satisfaction across the science community.

Through the NLI Program, the USGS supports world-class remote sensing research and development, land change science, land cover monitoring and assessments, and provides land and natural resource managers, policy makers, and other users with related data, tools, and information products. These activities include incorporating the long-term National Land Cover Database into the innovative Land Change Monitoring, Assessment, and Projection (LCMAP) umbrella product suites to evaluate the rates, causes and impacts of land change, and assess drivers of land change.



The NLI Program's science research includes fire fuel, behavior, risk modeling, and post-fire recovery monitoring; drought and water use monitoring for food security, and watershed hydrological modeling; sea-level rise and coastal change monitoring; and ecosystem services evaluation and natural capital accounting. These and other USGS products are fundamental to deliver future U.S. land change and outlook reports that would monitor the past trends, present current conditions, and forecast future risks and vulnerabilities of U.S. landscapes. This report could ultimately be used to inform local, Tribal, State, and Federal land use and management decisions that empower community safety, economic prosperity, sustainable development, and climate change adaptation. The NLI Program's science research products also provide crucial support to the national initiatives focused on natural resources, land conservation, climate mitigation and adaptation strategies.

The USGS National Civil Applications Center (NCAC) uses Earth observations from military and U.S. Intelligence Community sensors to detect wildland fires, compile Incident Commanders' wildfire response maps, and to monitor global volcanoes for aviation safety and local government information. The NCAC also manages the interagency Civil Applications Committee which oversees and facilitates appropriate Federal civil agency access to, and use of, military, intelligence, and commercial Earth observations. These observations are used extensively by the Interior, USGS, and numerous agencies for disaster response, environmental monitoring, and scientific research.

Under the NLI Program, the USGS administers the National Land Remote Sensing Education, Outreach and Research Activity, a longstanding remote sensing State grant program. The NLI Program recently awarded the latest competitive, multi-year grant to AmericaView, a university-led, State-based nationwide consortium of 300 university and local members across 41 States. The Remote Sensing State Grant Program supports the States by: expanding the use of Earth observation data including the extensive 50-year-plus Landsat satellite image archive; identifying State and local-level remote sensing data needs; supporting State landscape monitoring and resource management; advancing remote sensing education and training; and enabling technology transfer and outreach to enhance the Nation's current and future workforce. A crucial component of the grant activities is also to communicate vital State and local-level needs to support Landsat Next development and showcase the benefits to the States.

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Science Support

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Science Support

Science Support $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Administration and Management Program	**82,179**	**82,179**	**+2,267**	**0**	**+8,551**	**92,997**	**+10,818**
FTE	***319***	***319***	***0***	***0***	*+5*	***324***	*+5*
Information Services Program	**24,125**	**24,125**	**+330**	**0**	**+779**	**25,234**	**+1,109**
FTE	*57*	*57*	*0*	*0*	*+0*	*57*	*+0*
Science Support Total	**106,304**	**106,304**	**+2,597**	**0**	**+9,330**	**118,231**	**+11,927**
FTE	*376*	*376*	*0*	*0*	*+5*	*381*	*+5*

The 2025 budget request for Science Support is $118,231,000 and 381 FTE, a program change of +$9,330,000 and +5 FTE from the 2024 CR.

Mission Area Overview

The USGS Science Support activity provides business and information services that are crucial to conducting quality science, including acquisition and grants; finance; financial reporting; internal controls; communications; budget and performance; monitoring and evaluation of science quality and integrity; information assurance; information management and technology services; strategic planning; international program activities; Freedom of Information Act (FOIA); and human capital. Science Support also provides policy and analysis services related to technology transfer, intellectual property, agreement reviews, and directive management. Included under the Science Support umbrella are the offices of the Director; Administration; Budget, Planning, and Integration; Communications and Publishing; Diversity and Equal Opportunity; the FOIA Office; International Programs; Science Quality and Integrity; and the Associate Chief Information Officer (ACIO).

Science Support also includes the executive leadership and management that provide guidance, direction, and oversight for all USGS science activities. The Science Support team aids USGS science by providing science and operational leadership and oversight, including ensuring fiduciary responsibility, communicating the value and relevance of USGS science to the public and Congress, and verifying the validity and quality of USGS science.

FY 2023 Selected Mission Area Accomplishments

- The USGS developed and implemented targeted in-person trainings for new employees on scientific integrity. The USGS is using that experience to develop a new training module. This will further enhance the USGS' ability to create and sustain a culture of scientific integrity. Work also continues to fully integrate this type of training within new employee onboarding procedures.

- The USGS continued to actively pursue partnerships with colleges, universities, and organizations that encourage students to continue studies and pursue advanced degrees in natural science fields. These efforts used various methods, including internships, attendance at job fairs, the Partnership in STEM program (where 7 active partnerships exist), and surveys within USGS to determine the effectiveness of these actions.
- The USGS completed significant Environmental Assessments for the new Hawaii Volcano Observatory in Hilo, Hawaii and the new Energy and Minerals Research Facility in Golden, Colorado.
- The USGS provided National Environmental Policy Act (NEPA) training and support to multiple USGS projects and permitting to assist in meeting project schedules. Support included the Office of Management Services (OMS) working with the Alaska Science Center to ensure that fieldwork that required drilling in Alaska could be conducted in compliance with NEPA regulations. Additionally, OMS expedited consultation with the Alaska State Historic Preservation Office on Section 106 of the National Historic Preservation Act and the U.S. Fish and Wildlife Service on the Endangered Species Act (ESA), Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act for compliance during the breeding season.
- The Information Services Program continued its ongoing enhancement of USGS cloud computing resources to increase accessibility and usability for the Science Mission Areas. For example, the USGS used cutting-edge High-Performance Computing (HPC) and High Throughput Computing (HTC) along with cloud computing resources to refine the processing of archived data records and creating reliable analysis-ready planetary science data. USGS Astrogeology Science Center is using these resources to pioneer a new way to access and work with the High Resolution Imaging Science Experiment (HiRISE) camera. These are large data sets of planetary images with a significant amount of detail that are being processed and converted into streamable form for ease of access to the public. Using this process and products, the science community and the public can easily experience the Mars landscape in high resolution and 3D. This data is hosted by Amazon in their Open Data Registry for anyone to use for free.
- The Great Lakes Science Center largest research vessel, *Kiyi*, required a telecommunications system as it often spends several weeks at a time conducting science on Lake Superior where internet service is non-existent or unreliable. In partnering with the Office of the ACIO, internet service is now available onboard to conduct research and transmit data on the lake where there is zero cellular service. Implementing the telecommunications system has provided scientists on the research vessel the ability to communicate their data in real time.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

Science Support
Administration and Management Program

Science Support $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Administration and Management Program	**82,179**	**82,179**	**+2,267**	**0**	**+8,551**	**92,997**	**+10,818**
USGS Laboratories	[0]	[0]	[0]	[0]	+1,735	[1,735]	[+1,735]
Zero Emission Vehicles	[250]	[250]	[0]	[0]	+964	[1,214]	[+964]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+5,852	[5,852]	[+5,852]
FTE	***319***	***319***	***0***	***0***	***+5***	***324***	***+5***

Justification of 2025 Program Changes

The 2025 budget request for the Administration and Management Program is $92,997,000 and 324 FTE, a program change of +$8,551,000 and +5 FTE from the 2024 CR.

USGS Laboratories (+$1,735,000 / +5 FTE) – USGS laboratory science is critical to water resources decision making, critical mineral mapping, early detection of invasive species, and other concerns of Federal, State, and local partners, collaborators, and stakeholders. However, the USGS lacks a comprehensive oversight, training, and policy program for laboratories. Over 1,600 personnel work in USGS' nearly 500 laboratories in 175 unique locations nationwide, spanning all USGS Mission Areas.

The USGS proposes an increase for an integrated laboratory support, training, and oversight program to strengthen USGS laboratory quality, integrity, safety, and strategic investments. This funding would address multiple areas requiring attention, implementing training, safety, bio risk management, and animal welfare standards and controls across the labs for the benefit of people, the environment, and the public at large. This increase will also fund an external program review by the Advisory Committee for Science Quality and Integrity, providing an external perspective from a panel of subject matter experts to review the advances made by the USGS toward improved internal controls and quality management. Furthermore, this funding will enable the USGS to develop systems to make better strategic management decisions for future investments and funding portfolios that ensure the USGS can continue to provide the highest quality laboratory science to meet its mission. Ensuring support for and monitoring of laboratories and oversight of laboratory investments is critical to the efficient use of funding. Additionally, without proper training and oversight, the USGS is at risk of quality, integrity, and safety problems.

Zero Emissions Vehicles (ZEVs) (+$964,000 / +0 FTE) – The request for USGS includes $964,000 in the Administration and Management Program to support vehicle fleet lifecycle replacement, fleet requirements analysis, charging infrastructure planning and deployment, and

fleet capabilities assessments. Across Interior, the 2025 request includes $13 million for this purpose. This funding will continue Interior's efforts to right-size its fleet and replace vehicles with more efficient, mission capable, zero emissions vehicles (ZEV) at the right locations and with the right vehicle mix to deliver Interior's missions. USGS' fleet planning efforts will continue to ensure ZEVs are integrated into the overall fleet plan, prioritizing locations and appropriate missions for deployment of these vehicles. Additionally, this funding will assist USGS with adapting electric vehicle support equipment planning and deployment to address installation requirements which vary by geographic region. Finally, this funding provides USGS with the necessary support to coordinate fleet lifecycle replacement with infrastructure deployment.

Baseline Capacity - 2024 Fixed Costs (+$5,852,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $5,852,000 in the Administration and Management Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

The Administration and Management Program provides business and information services that are crucial to conducting quality science, including acquisition and grants; finance; financial reporting; internal controls; communications; budget and performance; monitoring and evaluation of science quality and integrity; information assurance; information management and technology services; strategic planning; international program activities; and human capital.

PROMOTING DIVERSITY IN THE FEDERAL WORKFORCE

Science Support

USGS

WHAT ARE WE DOING?

USGS recognizes its talented and diverse workforce as a key asset. Our success as an agency reflects the quality and skill of our people. The USGS is committed to seeking out and retaining a highly skilled and diverse workforce to ensure we accomplish our mission in the most effective, efficient, and robust way possible.

The GeoGirls Visit a Volcano Monitoring Station at Mount St. Helens
Source: USGS

WHY DOES THIS MATTER?

One of the core values of the USGS is the importance of diversity in our science and our workforce. The USGS is committed to creating opportunities for all.

The Office of the Director; Office of Administration; Office of Budget, Planning, and Integration; Office of Communications and Publishing; and Office of International Programs perform critical business functions such as bureau-wide leadership and direction; establishing organizational vision, mission, goals, and scientific priorities; planning, obtaining, and managing necessary resources, including people, budget

authority, facilities, and equipment; providing resource management systems; implementing statutory and regulatory requirements and monitors and enforcing compliance; communicating the USGS mission and science to Congress and the public; and supporting Interior's centralized administrative and business services through the Working Capital Fund.

The Office of Diversity and Equal Opportunity establishes, develops, implements, oversees, and evaluates USGS policies, principles, and practices aimed at promoting equal opportunity in all USGS activities and programs.

The Office of Science Quality and Integrity (OSQI) monitors and enhances the integrity, quality, and health of USGS science through executive oversight and development and enforcement of standards for scientific rigor and integrity through strong practices, policy, and supporting USGS programs. Within OSQI, the Office of Tribal Relations builds partnerships between the USGS and Native American and Alaska Native governments, Tribal organizations, and other Federal agencies in conducting gold-standard scientific research.

The Office of Human Capital (HC) provides high-quality service to USGS employees, ensuring that they have access to the support and resources they need. Within HC, the Office of Organizational and Employee Development (OED) provides a wide variety of scientific, technical, professional, managerial, and administrative development opportunities. OED manages the National Training Center in Denver, Colorado. OED also addresses the organizational needs of the USGS, providing consulting and coaching to improve the team and organizational health.

Scientific Integrity and Fundamental Science Practices

Science Support

USGS

What Are We Doing?

The USGS is dedicated to preserving the integrity of the scientific activities it conducts and that are conducted on its behalf. The USGS will not tolerate loss of integrity in the performance, use, or communication of scientific activities and their results.

Why Does This Matter?

The responsible planning, conduct, and communication of research is the bedrock of USGS science. Sustaining and fostering a culture of scientific integrity means conducting our work free from falsification, fabrication, plagiarism, and censorship, as well as adhering to the Code of Scientific and Scholarly Conduct.

Dr. Carol Meteyer at the National Wildlife Health Center applying knowledge and expertise in diverse scientific areas to study the most critically important diseases occurring in wildlife populations. Source: USGS

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Science Support
Information Services Program

Science Support $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Information Services Program	**24,125**	**24,125**	**+330**	**0**	**+779**	**25,234**	**+1,109**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+779	[779]	[+779]
FTE	***57***	***57***	***0***	***0***	***+0***	***57***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for the Information Services Program is $25,234,000 and 57 FTE, a program change of +$779,000 and +0 FTE from the 2024 CR.

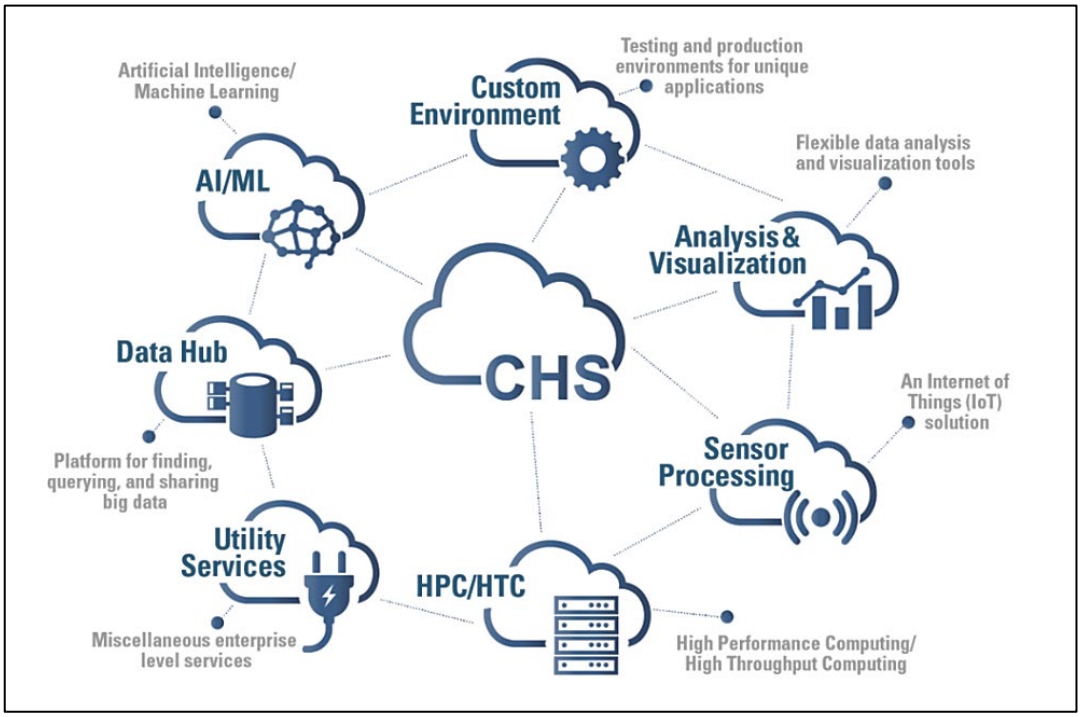
Baseline Capacity - 2024 Fixed Costs (+$779,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $779,000 in the Information Services Program which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet the must pay operational requirements without impacting program activities.

Program Overview

Information Services (IS) includes the Office of the ACIO. The components within ACIO include the Office of the Chief, Information Security, Enterprise Infrastructure, Integrated Science Solutions, and End User Services. ACIO also provides funding for the Freedom of Information Act office.

The ACIO provides enterprise services to execute the bureau's mission and to regional offices that support the USGS Science Strategy. These service offerings enhance computing capacity and foundational predictive science capabilities.

IS provides the critical Information Management & Technology (IMT) foundation for the USGS science mission by implementing advances in IMT and using them to facilitate research, data gathering, analysis, modeling, scientific collaboration, knowledge management, and efficiencies in both business and administrative processes. IS supports numerous IMT services, such as the USGS information assurance program; network capacity and cloud services; telecommunications and customer support; portfolio management; application development and delivery programs; and supports the Interior IMT activities through the Interior's Working Capital Fund.



ACIO's Cloud Hosting Service (CHS) provides cloud hosting services through a virtual data center. In addition to the virtually unlimited storage and computing capabilities of the Cloud, CHS has a cloud-based ecosystem of services including high-performance computing, data visualization, sensor processing, artificial intelligence/machine learning, analytics, data storage, and more.

Facilities

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Facilities

Facilities $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Rental Payments and Operations & Maintenance Program	**113,211**	**113,211**	**-12,643**	**0**	**+5,141**	**105,709**	**-7,502**
FTE	***69***	***69***	***0***	***0***	***+0***	***69***	***+0***
Facilities Maintenance, Modernization and Restoration Program	**74,840**	**74,840**	**+11**	**0**	**-162**	**74,689**	**-151**
FTE	***2***	***2***	***0***	***0***	***+0***	***2***	***+0***
Facilities Total	**188,051**	**188,051**	**-12,632**	**0**	**+4,979**	**180,398**	**-7,653**
FTE	***71***	***71***	***0***	***0***	***+0***	***71***	***+0***

The 2025 budget request for the Facilities Mission Area is $180,398,000 and 71 FTE, a program change of +$4,979,000 and +0 FTE from the 2024 CR.

Mission Area Overview

The USGS Facilities activity provides safe, functional workspace to accomplish the bureau's scientific mission, with an emphasis on the USGS mission driving facility needs. The goal of Facilities is to meet bureau science needs while optimizing facility locations and functionality of workspace, and reducing costs. The USGS defines facilities as all sites where USGS activities are housed and mission-related work is conducted. Facilities typically provides space for offices, laboratories, storage, and parking, as well as shared support for cafeterias, conference rooms, and other common space uses. USGS research vessels are also considered facilities for funding purposes. Rent costs, basic facility operations, and security are funded and performed through this program, as is facility maintenance which, in compliance with Federal, State, and local standards, provides a safe, sustainable working environment for employees, visiting partners, and customers.

USGS partners with other Federal agencies, State and local governments, universities, and the private sector to provide appropriate space for USGS scientists and other staff. Collaboration with these partners supports the USGS's scientific work and facilitates communication of the results of this work to the public, emergency managers, and the scientific community. In these instances, the USGS occupies space in return for science-related services or space is acquired as part of a larger cooperative agreement. Typically, the USGS pays a reduced rental rate or the cost of operations and maintenance when in partner space. Co-locations with other bureaus, agencies, or universities is a space management strategy that advances science, creates partnerships, and facilitates recruitment of new talent.

FY 2023 Selected Mission Area Accomplishments

- **Moffett Field Laboratory, Warehouse, and Office Space:** This is the final phase of a project to relocate all USGS employees and capabilities in Menlo Park, CA to co-located space on the campus of the National Aeronautics and Space Administration (NASA) Ames Research Park at Moffett Field in Mountain View, CA. The consolidation at Moffett Field will include warehouse and office space, as well as numerous individual labs currently at Menlo Park into modern, shared, and more space-efficient multifunctional labs. All design and permitting requirements have been completed and construction is under contract and in progress for the remaining office, lab, and warehouse space. In FY 2023, 86 percent of the construction for the new laboratory was completed. The relocation and consolidation are on track for the new laboratory. Lab construction was completed in early FY 2024, and completion of the office and warehouse space is scheduled for late FY 2024. Decommissioning of the Menlo Park Campus is expected to be complete in early FY 2025.
- **Hydrologic Instrumentation Facility (HIF) Building:** The HIF was built by NASA for the USGS in the early 1970s and is located at the NASA Stennis Space Center in Bay St. Louis, MS. It is foundational for national, high quality water observing systems, providing quality-assured hydrologic instrumentation and data collection equipment, testing of in-service instruments, and evaluation of new technology and instrumentation. In FY 2020, the USGS received funding to build a new facility, which will be co-located with complementary academic and Federal partners. The new facility will include new capabilities that will meet the hydrologic equipment needs of the USGS Next Generation Water Observing System. The construction contract was awarded in December 2021 with construction initiated in January 2022 to build the new HIF at the University of Alabama in Tuscaloosa, AL. In FY 2023, 65 percent of the construction for the new HIF facility was completed. Construction progress continues in FY 2024 with commissioning at the new facility, with project closeout and occupancy scheduled for late FY 2024.
- **Hawaiian Volcano Observatory (HVO) & Pacific Island Ecosystem Research Center (PIERC) Facilities:** The mission of the HVO is to monitor, investigate, and assess hazards from active volcanoes and earthquakes in Hawaii and to communicate the results of this work to the public, emergency managers, and the scientific community. The HVO facility, perched on the rim of Kilauea Volcano's summit caldera in the Hawaii Volcanoes National Park, was evacuated on May 16, 2018, in response to eruptive activity. During the 2018 eruption, the facility sustained irreparable damage from the ground deformation and repeated earthquakes associated with the collapse of the summit crater. In response, the USGS is constructing a new field station in the park and working with the University of Hilo to build a new observatory and science center for all USGS employees on the island of Hawaii (both HVO and PIERC) in Hilo. Construction at the new HVO Field Station started at the end of FY 2023 and will continue throughout FY 2024. The construction for the main lab facility in Hilo is expected to begin in spring FY 2024.

For additional information about these programs, please see the Program Book on the USGS website (www.usgs.gov).

Facilities
Rental Payments and Operations and Maintenance Program

Facilities $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Rental Payments and Operations & Maintenance Program	**113,211**	**113,211**	**-12,643**	**0**	**+5,141**	**105,709**	**-7,502**
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+5,141	[5,141]	[+5,141]
FTE	***69***	***69***	***0***	***0***	***+0***	***69***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for Rental Payments and Operations and Maintenance Program is $105,709,000 and 69 FTE, a program change of +$5,141,000 and +0 FTE from the 2024 CR.

Baseline Capacity - 2024 Fixed Costs (+$5,141,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and the pay requirements needed to continue to fulfill the USGS scientific mission. The budget includes $5,141,000 for Rental Payments and Operations and Maintenance which reflects the incremental amount needed to cover the fixed costs associated with mission operations in FY 2024. This request in combination with the FY 2025 fixed costs amounts will allow the program to meet the must pay requirements without impacting program activities. In FY 2025, USGS estimates that it will cost $173.3 million to cover rental payments ($113.3 million) and Operations and Maintenance ($59.9 million) needs. Based on this estimate, as has been the practice in previous years, funding from the Rental Payments and Operations and Maintenance Program and USGS reimbursable partners would cover as much of the costs as possible. The remainder of the costs will need to be covered by the science mission areas, reducing the amount of funding available for science priorities. Under the FY 2024 Annualized CR, USGS will have science programs cover about $17 million of these costs, and in FY 2023, science mission areas had to cover about $16.3 million. Facilities rental payments and operations and maintenance costs are must-pay bills. When USGS does not receive fixed costs to cover these payments, the amount the science mission areas need to provide to cover these bills increases.

Program Overview

The Rental Payments and Operations and Maintenance Program provides the USGS with funding needed to pay for annual rent and operations and maintenance costs. Rental payments are made to the General Services Administration (GSA), other Federal sources, private lessors, and cooperators for space occupied

by the USGS. The USGS is continually working to enhance facilities efficiencies, in terms of both costs and mission needs. For example, the consolidation of USGS employees into the NASA Ames Research Park at Moffett Field in Mountain View, CA in FY 2020, and the consolidation of additional Bureau of Indian Affairs employees into the J.W. Powell building in Reston, VA in FY 2023 provide enhanced research collaboration opportunities and science innovations, as well as lower and more stable facilities costs for the foreseeable future.

The USGS has locations at several rented facilities across the United States and will be renewing space agreements for many of them over the next 18 months. There is a potential for relocations in 21 States based on lease expirations, lease negotiations, and market availability. If a move is necessary, the initial plan is for the new location to remain within the same commuting area. The following table details these current locations up for lease renewal:

City	State	Street
Charlotte	NC	810 Tyvola Road
Lutz	FL	4446 Pet Lane
Charleston	SC	219 Fort Johnson Road
Mounds View	MN	2270 Woodale Drive
Oklahoma City	OK	Broadway Executive Park
Fort Worth	TX	501 West Felix Street
Wichita	KS	7920 West Kellogg
Ft Myers	FL	1400 Colonial Blvd
East Hartford	CT	101 Pitkin Street
Buffalo	NY	1000 Putnam Way
Coram	NY	2045 Route 112
Middletown	NY	120 US Route 209 South (12 Metz Rd)
Gladstone	MI	820 Rains Drive
Cook	WA	5501 A Cook Underwood Rd.
Rolla	MO	1400 Independence Rd
Riverton	WY	1225 Market Street
Santa Maria	CA	3130 Skyway Drive
Eureka	CA	716 UNIT E W CEDAR STREET
Wheat Ridge	CO	11111 44th Ave
New Cumberland	PA	215 Limekiln Rd
Ewing Township	NJ	818820 SILVA SREET UNIT 800B

The USGS has unique facility and modern laboratory space requirements to support science functions and relies on a mix of owned, leased, and other agency provided space to meet those needs.

The 2025 budget will allow the USGS to:

- Begin funding the annual operating and maintenance costs for the following new facilities that will become operational in FY 2025:
    - A new laboratory at Moffett Field, CA;

  - The Hydrologic Instrumentation Facility in Tuscaloosa, AL; and
  - The Hawaiian Volcano Observatory in Hawaii Volcanoes National Park, HI.
- Coordinate facility planning with science planning to provide safe, high-quality workspace aligned with science needs.
- Continue supporting the USGS scientific mission by providing facilities with unique space requirements.
- Reduce energy intensity by 30 percent compared to FY 2003 in support of Executive Order 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability
- Implement cost savings initiatives through space consolidations.

PROPERTY AND LABORATORY MANAGEMENT

Facilities

USGS

WHAT ARE WE DOING?

The USGS has more than 400 locations across the United States. Its mission is to collect, monitor, analyze, and provide scientific understanding about natural resource conditions, issues, and problems. To support these mission areas, the USGS occupies nearly 1,200 assets, including buildings, land, structures, and vessels.

WHY DOES THIS MATTER?

Priority of the program is to continue the important work of the Department of the Interior and the USGS, while also maintaining the health and safety of our employees and community.

The USGS National Center (105 acres) located in Reston, Virginia provides for the agency's widespread activities for the Survey employees located in the Washington, D.C, metropolitan area. The site also provides habitat for many native and migratory birds, insects, and large and small mammals.
Source: USGS.

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Facilities
Facilities Maintenance, Modernization, and Restoration Program

Facilities $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 President's Budget	Change from 2024 Annualized CR (+/-)
Facilities Maintenance, Modernization and Restoration Program	**74,840**	**74,840**	**+11**	**0**	**-162**	**74,689**	**-151**
Department of the Interior Field Communications Modernization (DIFCOM)	[176]	[176]	[0]	[0]	-176	[0]	[-176]
Baseline Capacity - 2024 Fixed Costs	[0]	[0]	[0]	[0]	+14	[14]	[+14]
FTE	***2***	***2***	***0***	***0***	***+0***	***2***	***+0***

Justification of 2025 Program Changes

The 2025 budget request for Facilities Maintenance, Modernization, and Restoration (FMMR) is $74,689,000 and 2 FTE, a program change of -$162,000 and -0 FTE from the 2024 CR.

Technical Adjustment: Facilities Maintenance, Modernization, and Restoration (FMMR)
Proposal: In order to align infrastructure investment more effectively across DOI, the USGS proposes to change the name for the subactivity "Deferred Maintenance and Capital Improvement" to "Facilities Maintenance, Modernization, and Restoration." This name change supports Interior's efforts to standardize terms and clarify definitions and asset management concepts around a common asset management framework.

This proposal would continue to strengthen the USGS' science by equipping USGS science centers with the infrastructure needed to meet the challenges of the 21st century. Realigning the Facilities - Deferred Maintenance and Capital Improvement (DMCI) to the Facilities - Facilities Maintenance, Modernization, and Restoration (FMMR) would:

- Improve coordination with the DOI, other bureau asset managers, and stakeholders using standard infrastructure investment terms.
- Support standard investment terms used across Interior that are integrated into USGS investment planning in the areas of budget formulation, Five Year Capital Improvement and Deferred Maintenance Plan development, and the systems that support them (e.g., the Facilities Maintenance Management System (FMMS).
    - Integrate large infrastructure investment and modernization projects into the Bureau's Lifecycle Investment Five-Year Plan that expand beyond a standard deferred maintenance and capital improvement project.

Department of the Interior Field Communications Modernization (DIFCOM) (-$176,000 / -0 FTE) – The Department continues to support modernization of Interior's field communications capabilities through a Departmentwide governance structure, implementation guidance, and information collection that supports modernization and interoperability. The request does not provide dedicated funding for implementation of DIFCOM projects by region, but the USGS will continue to support implementation of field communications modernization efforts through information gathering, and the coordinated, cyclic replacement of equipment and infrastructure.

Baseline Capacity - 2024 Fixed Costs (+$14,000 / +0 FTE) – The 2025 budget includes important investments in programs needed to help strengthen America to be more competitive as the world continues to change. These investments include funding needed to maintain a strong, talented workforce, and other must pay requirements needed to continue to deliver the USGS mission. The budget includes $14,000 for Facilities Maintenance, Modernization, and Restoration which reflects the incremental amount needed to cover the fixed cost requirements in FY 2024. This request in combination with the FY 2025 fixed costs amounts are needed to meet must pay operational requirements without impacting program activities.

Program Overview

Facilities Maintenance, Modernization, and Restoration (FMMR) funding provides for construction, modernization, and maintenance/repair projects on USGS-owned and maintained assets and infrastructure. Funding is provided to the highest-priority facility requirements in support of USGS mission needs. Prioritization follows annual Interior budget guidelines and funding is primarily directed toward projects that stabilize, restore, replace, or improve life-cycle performance of assets that are mission critical or mission dependent. Projects that facilitate space consolidation, improve utilization, promote energy efficiency and sustainability in support of Executive Order 14057, and reduce the bureau space footprint also receive FMMR funding as do other facilities maintenance and management activities that identify, document, track, and remediate deferred maintenance needs.

At the end of fiscal year 2023, the USGS had a total Deferred Maintenance and Repair (DM&R) backlog of $175.9 million for both owned assets and assets for which the USGS pays operations and maintenance in lieu of rent[2]. The total DM&R backlog consists of $175.3 million associated with assets supporting current mission needs and $0.6 million in future mission needs. These assets include operational buildings, housing assets, and water infrastructure and utilities. In 2023, about 90 percent of funding was dedicated to mission critical on-going major construction projects funded through specific Congressional appropriations. The USGS estimates that if requested funding levels prevailed through 2027, these construction projects will require about 85 percent of program funding through at least 2027 with the remaining funding going towards deferred maintenance projects and bureau lifecycle investment funded programs.

The FY 2025 budget requests $74.7 million to continue lifecycle investment projects, many of which have been directed and/or approved by Congress since FY 2018. Current levels of lifecycle investments will likely result in an increased DM&R backlog in FY 2025 as the majority of funding is directed to critical, priority construction projects. This USGS lifecycle management strategy invests in the construction of mission-critical buildings to ensure that USGS activities are supported into the future. Work at the National Wildlife Health Center (NWHC), Upper Midwest Environmental Sciences Center, and Woods Hole Coastal and Marine Science Center, once complete, will have the added benefit of reducing the DM&R backlog. By prioritizing funding for these projects in FY 2025 and the next several years, the USGS will update critical facilities and control costs, as factors outside the bureau's control have caused construction costs across the U.S. to increase. The following table provides a description of how those funds will be used, followed by project descriptions for major infrastructure projects. This allocation reflects current plans but is subject to change.

Project Title	Description	FY 2025 Request ($000)
National Wildlife Health Center	NWHC Phase II Modernization	$66,048
Woods Hole Coastal and Marine Science Center	Woods Hole Coastal and Marine Science Center Consolidation Planning and Design	$5,000
Upper Midwest Environmental Sciences Center	Facility-Wide Water Conservation and Infrastructure Improvements (PFAS)	$1,000
Denver Federal Center	Phase 1 Design- Colorado University Boulder Lease Consolidation to Building 95	$500
Northern Prairie Wildlife Research Center	NPWRC Septic Replacement at Administration & Shop Buildings	$232
Bureau Lifecycle Investment Funded Programs	Programs supporting facilities condition assessments, maintenance management system, and project planning and support.	$1,909
Total		**$74,689**

[2] Of the $175.9 million, $140.6 million was reported in the Federal Real Property Profile aligned with the GSA reporting guidance.

Major Infrastructure Project Descriptions

National Wildlife Health Center (NWHC)

The NWHC was established in 1975 to serve the Nation by providing sound science and technical support regarding wildlife disease, and to disseminate information to promote science-based decisions affecting wildlife and ecosystem health. NWHC personnel study emerging and resurging diseases, wildlife and ecosystem health, zoonotic diseases, and environmental health and degradation. The NWHC is located on 24 acres and maintains offices and high security disease laboratories in the Main Building (MB) and the Tight Isolation Building (TIB).

The NWHC is the only Federal Bio Safety Level (BSL) 3 facility dedicated exclusively to scientific investigation and research on wildlife diseases that threaten human, animal, and environmental health. The current enhanced BSL-3 laboratories are at risk of no longer meeting biosecurity requirements for certain diseases and the original design of the building does not meet best practices for a modern high-level biocontainment facility. If not replaced within the next 5 to 10 years, the laboratory may lose its Federal Select Agent Program (FASAP) registration, and Interior will lose the ability to conduct nationally and internationally important work on detecting, characterizing, monitoring, preventing, and controlling some of the most harmful wildlife diseases, many of which can jump to livestock or humans. This project will enhance Interior's capability to address safety and security concerns related to infectious wildlife diseases and their possible use as bioterrorism agents, reduce deferred maintenance, and address major infrastructure needs.

When implemented, the project will address one of the highest USGS facility needs. The goal is to modernize the NWHC through the construction of replacement facilities. The modernized facility will include start-of-the-art BSL-3 laboratories that support USGS and the NWHC's mission of research and surveillance on economically and ecologically harmful wildlife diseases. This new building will align with multiple DOI strategic objectives, including to optimize maintenance, repair, and construction for our highest-priority facilities, to enable proactive lifecycle management for the Department's facility portfolio, and to reduce energy and greenhouse gas emissions from DOI vehicles and facilities. The modernization project will also align with the sustainability goals set forth in E.O. 14057 and feature on site renewable energy and energy efficiency investments, including solar, high performance building envelope systems, and geothermal energy. The planned timeline for the completion of design and then construction is FY 2024 and FY 2027, respectively.

Woods Hole Coastal and Marine Science Center (WHCMSC)

The Woods Hole project will consolidate operations and functions from multiple locations and buildings (including vacating GSA Leased space) into a single, newly constructed, government owned facility that creates a modern, ergonomic, secure, safe, and healthy workplace. The funding requested for FY 2025 will be used to develop the design and construction drawings for the new building.

The USGS facilities in operation today were built in 1971-1972 as temporary, prefabricated structures and assembled on-site. They have been adapted to a range of functional requirements over the past 50+ years and were not built to serve as long term facilities. They are well beyond their intended service life and have significant deferred maintenance and accessibility issues that create safety, logistical, and operational challenges.

The project demonstrates a major and measurable contribution to established goals and objectives of the Department and the Bureau. It will result in:

- Significant annual savings to the Bureau and taxpayers due to rent savings;
- More effective use of Federal property;
- Vacating GSA leased space;
- Increased efficiency in mission operations;
- Increased direct collaborations with Woods Hole Oceanographic Institute (WHOI), which will lead to technology enhancements and science advances that improve public safety, natural hazard threat assessment, and management and conservation of public natural resources;
- Enhanced laboratory/research environments;
- Adaptable energy efficient facilities capable of supporting program/staffing changes over time.

The project demonstrates a measurable savings for the Government. Failure to complete this project would have both a direct impact on employee health and safety due to current conditions and direct impacts on natural resources. The mission of the Coastal/ Marine Hazards and Resources Program is to conduct research and develop science-based tools that lead to safer, more productive coastal communities and improved stewardship of natural resources. The WHCMSC supports that mission by providing products that are used by other Federal agencies, State and local entities, private organizations, and the public to make informed decisions about the use, management, and protection of our coastal and marine resources.

Upper Midwest Environmental Sciences Center (UMESC)

The FY 2025 request is anticipated to fully fund the UMESC facility-wide water conservation and infrastructure improvement project. This project will reduce the consumption of groundwater, identify methods to limit discharge of effluent containing per- and polyfluoroalkyl substances (PFAS), and provide PFAS-free water for UMESC research laboratories and aquatic animal rearing. Preventing discharge of effluent containing PFAS is essential to protect the health of aquatic ecosystems, to preserve habitats, to ensure long-term sustainability of our water resources and to protect the public health. This project has an estimated completion date of FY 2029.

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USGS Working Capital Fund

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Working Capital Fund

The Working Capital Fund (WCF) is used for expenses necessary to furnish materials, supplies, equipment, work, and services in support of the USGS programs, and as authorized by law, to Federal and non-Federal entities.

The WCF consists of the following components:

- **The WCF Investment Component** provides a mechanism to assist USGS managers in planning for and acquiring goods and services that are too costly to acquire in a single fiscal year or that, due to the nature of services provided, requires a multi- as opposed to a single-year basis of funding. Investments are supported by documented investment plans that include estimated acquisition/replacement costs, a schedule of deposits, and approval of the plans, deposits, and expenditures by designated USGS officials.

- **The WCF Fee-for-Service Component** provides a continuous cycle of client services for fees established in a rate-setting process established by designated USGS officials. Fees are predicated upon both direct and indirect costs associated with providing the services, including amortization of equipment required to provide the services.

- **The GSA Buildings Delegation Component** is used to manage funds received under the delegated authority for the J.W. Powell Building and Advanced Systems Center in Reston, VA, as provided by 40 U.S.C. 121 (d) and (e) (formerly subsections 205 (d) and (e) of the Federal Property and Administrative Services Act of 1949, as amended, and 40 U.S.C. 486 (d) and (e), respectively). Delegated functions include building operations, maintenance, cleaning, overseeing fire and life safety, maintaining high voltage switchgear and fire alarms, recurring repairs, minor alterations, historic preservation, concessions, energy management and security. Because of the size of the Reston buildings and the need to expend the facility funds in a manner corresponding to GSA's no-year funding (Federal Buildings Fund) mechanisms and the GSA National Capital Region long-range capital improvement plan, no-year funding is a prerequisite to administering the delegation. Public Law 104–208, Section 611, provides that, for the fiscal year ending September 30, 1997, and thereafter, any department or agency that has delegated authority shall retain that portion of the GSA rental payment available for operation, maintenance, and repair of the building and the funds shall remain available until expended. This component was established in 2004 to provide the USGS with this no-year flexibility.

Appropriation Language and Citations

P.L. 101-512 Department of the Interior and Related Agencies Appropriations Act, 1991. This authority established a Working Capital Fund account in 1991. The Telecommunications Amortization Fund was included as part of the WCF and all balances of the Telecommunications Amortization Fund existing at the end of 1990 were transferred to the WCF. These balances were to be used for the same purposes as originally authorized.

P.L. 103-332 Department of the Interior and Related Agencies Appropriations Act, 1995. This authority expanded the use to partially fund laboratory operations and facilities improvements and to acquire and replace publication and scientific instrumentation and laboratory equipment.

WORKING CAPITAL FUND

Employment Summary

Identification Code 14-4556-0-4-306		2023 Actual	2024 Estimate	2025 Estimate
	Reimbursable:			
2001	Civilian full-time equivalent employment	105	105	105

Special Initiatives

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Special Initiatives

Special Initiatives $ in thousands	2023 Actual	2024 Annualized CR	2025 Fixed Costs (+/-)	2025 Internal Transfers (+/-)	2025 Program Changes (+/-)	2025 Request	Change from 2024 Annualized CR (+/-)
2023 Special Initiatives	**2,130**	**2,130**	**0**	**0**	**-2,130**	**0**	**-2,130**
Harney Watershed Council for Harney Basin Water Resource Planning Support	[250]	[250]	0	0	-250	[0]	[-250]
Kuskokwim River Intertribal Fish Commission for Implementation of Intertribal Federal Subsistence Cooperative Management Program	[880]	[880]	0	0	-880	[0]	[-880]
University of Illinois Aquifer Mapping	[1,000]	[1,000]	0	0	-1,000	[0]	[-1,000]
FTE	***0***	***0***	***0***	***0***	***0***	***0***	***0***

Justification of 2025 Program Changes

The 2025 budget request for Special Initiatives is $0 and 0 FTE, a program change of -$2,130,000 and 0 FTE from the 2024 CR. The budget does not request funding for Congressionally Directed Spending and Community Project Funding (Special Initiatives) included in the 2023 enacted bill.

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USGS Accounts

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USGS Accounts

Appropriations Language

SURVEYS, INVESTIGATIONS, AND RESEARCH

(INCLUDING TRANSFER OF FUNDS)

For expenses necessary for the United States Geological Survey to perform surveys, investigations, and research covering topography, geology, hydrology, biology, and the mineral and water resources of the United States, its territories and possessions, and other areas as authorized by 43 U.S.C. 31, 1332, and 1340; classify lands as to their mineral and water resources; give engineering supervision to power permittees and Federal Energy Regulatory Commission licensees; administer the minerals exploration program (30 U.S.C. 641); conduct inquiries into the economic conditions affecting mining and materials processing industries (30 U.S.C. 3, 21a, and 1603; 50 U.S.C. 98g(a)(1)) and related purposes as authorized by law; and to publish and disseminate data relative to the foregoing activities; $1,578,298,000, to remain available until September 30, 2026; of which $110,507,000 shall remain available until expended for satellite operations; and of which $74,689,000 shall be available until expended for deferred maintenance and capital improvement projects that exceed $100,000 in cost: Provided, That none of the funds provided for the ecosystem research activity shall be used to conduct new surveys on private property, unless specifically authorized in writing by the property owner: Provided further, That no part of this appropriation shall be used to pay more than one-half the cost of topographic mapping or water resources data collection and investigations carried on in cooperation with States and municipalities: Provided further, That of the amount appropriated under this heading, not to exceed $15,000 may be for official reception and representation expenses.

Note.--A full-year 2024 appropriation for this account was not enacted at the time the Budget was prepared; therefore, the Budget assumes this account is operating under the Continuing Appropriations Act, 2024 and Other Extensions Act (Division A of Public Law 118-15, as amended). The amounts included for 2024 reflect the annualized level provided by the continuing resolution.

ADMINISTRATIVE PROVISIONS

From within the amount appropriated for activities of the United States Geological Survey such sums as are necessary shall be available for contracting for the furnishing of topographic maps and for the making of geophysical or other specialized surveys when it is administratively determined that such procedures are in the public interest; construction and maintenance of necessary buildings and appurtenant facilities; acquisition of lands for gauging stations, observation wells, and seismic equipment; expenses of the United States National Committee for Geological Sciences; and payment of compensation and expenses of persons employed by the Survey duly appointed to represent the United States in the negotiation and administration of interstate compacts: Provided, That activities funded by appropriations herein made may be accomplished through the use of contracts, grants, or cooperative agreements (including noncompetitive cooperative agreements with Tribes) as defined in section 6302 of title 31, United States Code: Provided further, That the United States Geological Survey may enter into contracts or cooperative agreements directly with individuals or indirectly with institutions or nonprofit

organizations, without regard to 41 U.S.C. 6101, for the temporary or intermittent services of students or recent graduates, who shall be considered employees for the purpose of chapters 57 and 81 of title 5, United States Code, relating to compensation for travel and work injuries, and chapter 171 of title 28, United States Code, relating to tort claims, but shall not be considered to be Federal employees for any other purposes.

Note.--A full-year 2024 appropriation for this account was not enacted at the time the Budget was prepared; therefore, the Budget assumes this account is operating under the Continuing Appropriations Act, 2024 and Other Extensions Act (Division A of Public Law 118-15, as amended). The amounts included for 2024 reflect the annualized level provided by the continuing resolution.

Appropriations Language Change:

The 2025 budget proposes appropriations language to enable USGS to use up to $15,000 of appropriated amounts for courtesy and social responsibilities associated with official duties, including outreach and engagement with Tribal partners to honor traditions. This request would provide USGS similar authority provided to other agencies to extend hospitality to official visitors without bureau employees bearing expenses from their own personal funds.

The budget proposes appropriations language that will improve the USGS' ability to offer grants and cooperative agreements to Tribes. By addressing barriers to applying for and accessing DOI discretionary grants, the USGS can better support Tribes in improving long-term sustainable development and quality of life for their members.

Authorizations

A full listing of USGS authorizations is available at the USGS Office of Budget, Planning, and Integration website.

Website: https://www.usgs.gov/about/organization/science-support/budget/authorizations

Expiring Authorizations

P.L. 116-94

- Further Consolidated Appropriations Act, 2020
    - Great Lakes Monitoring, Assessment, Science, and Research – Sec. 201, authority for conducting monitoring, assessment, science, and research, in support of the binational fisheries ($15,000,000)

P.L. 117-58

- Infrastructure Investment and Jobs Act (also known as the Bipartisan Infrastructure Law)
    - Water Resources Research Institutes – Sec. 50221, authority of interstate water problems ($3,000,000)

2025 President's Budget
Summary of Requirements
U.S. Geological Survey
Surveys, Investigations, and Research
(Dollars in Thousands)

Surveys, Investigations, and Research	2023 Actual	2023 Actual FTE	2024 Annualized CR	2024 Annualized CR FTE	2025 Request Fixed Costs (+/-)	2025 Request Internal Transfers (+/-)	2025 Request Program Changes $	2025 Program Changes FTE (+/-)	2025 Request	2025 Request FTE	Request TOTAL Change from CY (+/-)
Surveys, Investigations, and Research											
Ecosystems											
Environmental Health Program	30,457	132	30,457	132	+572	-	+975	+0	32,004	132	+1,547
Species Management Research Program	63,904	253	63,904	253	+1,096	-	+1,850	-2	66,850	251	+2,946
Land Management Research Program	54,806	237	54,806	237	+1,045	-	+4,700	+14	60,551	251	+5,745
Biological Threats and Invasive Species Research Program	46,622	211	46,622	211	+915	-	-2,071	-17	45,466	194	-1,156
Cooperative Research Units Program	28,206	155	28,206	155	+672	-	+895	+0	29,773	155	+1,567
Climate Adaptation Science Center and Land Change Science Program (OLD)	83,181	214	83,181	214	+0	-83,181	+0	-214	-	-	-83,181
Ecosystems Change Research Program (NEW)	-	-	-	-	+464	+20,066	+1,651	+109	22,181	109	+22,181
National and Regional Climate Adaptation Science Centers (NEW)	-	-	-	-	+464	+63,115	+5,721	+108	69,300	108	+69,300
Total, Ecosystems	**307,176**	**1,202**	**307,176**	**1,202**	**+5,228**	-	**+13,721**	**-2**	**326,125**	**1,200**	**+18,949**
Energy and Mineral Resources											
Energy Resources Program	33,365	127	33,365	127	+659	-	+5,467	+7	39,491	134	+6,126
Mineral Resources Program (OLD)	70,855	260	70,855	260	+0	-70,855	+0	-260	-	-	-70,855
Mineral Resources Program (NEW)	-	-	-	-	+1,582	+70,855	+8,405	+271	80,842	271	+80,842
Total, Energy and Minerals Resources	**104,220**	**387**	**104,220**	**387**	**+2,241**	-	**+13,872**	**+18**	**120,333**	**405**	**+16,113**
Natural Hazards											
Earthquake Hazards Program	92,651	238	92,651	238	+1,264	-	+951	+3	94,866	241	+2,215
Volcano Hazards Program	37,500	144	37,500	144	+801	-	+1,383	+0	39,684	144	+2,184
Landslide Hazards Program	14,432	44	14,432	44	+253	-	-648	-1	14,037	43	-395
Global Seismographic Network Program	7,273	12	7,273	12	+63	-	+100	+0	7,436	12	+163
Geomagnetism Program	5,251	14	5,251	14	+74	-	+119	+0	5,444	14	+193
Coastal/Marine Hazards and Resources Program	43,149	202	43,149	202	+1,106	-	+4,919	+4	49,174	206	+6,025
Total, Natural Hazards	**200,256**	**654**	**200,256**	**654**	**+3,561**	-	**+6,824**	**+6**	**210,641**	**660**	**+10,385**
Water Resources											
Water Availability and Use Science Program	74,296	313	74,296	313	+1,193	-	+6,523	+44	82,012	357	+7,716
Groundwater and Streamflow Information Program	114,558	483	114,558	483	+1,878	-	+4,954	+10	121,390	493	+6,832
National Water Quality Program	100,080	467	100,080	467	+1,786	-	+4,286	+8	106,152	475	+6,072
Water Resources Research Act Program	15,500	2	15,500	2	+0	-	-15,500	-2	-	-	-15,500
Total, Water Resources	**304,434**	**1,265**	**304,434**	**1,265**	**+4,857**	-	**+263**	**+60**	**309,554**	**1,325**	**+5,120**

2025 President's Budget

Summary of Requirements

U.S. Geological Survey

Surveys, Investigations, and Research

(Dollars in Thousands)

					2025						
Surveys, Investigations, and Research	2023 Actual	2023 Actual FTE	2024 Annualized CR	2024 Annualized CR FTE	Request Fixed Costs (+/-)	Request Internal Transfers (+/-)	Request Program Changes $	Program Changes FTE (+/-)	Request	Request FTE	Request TOTAL Change from CY (+/-)
Surveys, Investigations, and Research											
Core Science Systems											
National Geospatial Program	93,650	212	93,650	212	+1,065	-	-8,468	+2	86,247	214	-7,403
National Cooperative Geologic Mapping Program	44,556	136	44,556	136	+665	-	+1,096	+0	46,317	136	+1,761
Science Synthesis, Analysis and Research Program	30,480	75	30,480	75	+406	-	+5,766	+8	36,652	83	+6,172
National Land Imaging Program	115,921	166	115,921	166	+811	-	+27,068	+38	143,800	204	+27,879
Total, Core Science Systems	**284,607**	**589**	**284,607**	**589**	**+2,947**	-	**+25,462**	**+48**	**313,016**	**637**	**+28,409**
Science Support											
Administration and Management Program	82,179	319	82,179	319	+2,267	-	+8,551	+5	92,997	324	+10,818
Information Services Program	24,125	57	24,125	57	+330	-	+779	+0	25,234	57	+1,109
Total, Science Support	**106,304**	**376**	**106,304**	**376**	**+2,597**	-	**+9,330**	**+5**	**118,231**	**381**	**+11,927**
Facilities											
Rental Payments and Operations & Maintenance Program	113,211	69	113,211	69	-12,643	-	+5,141	+0	105,709	69	-7,502
Facilities Maintenance, Modernization and Restoration Program	74,840	2	74,840	2	+11	-	-162	+0	74,689	2	-151
Total, Facilities	**188,051**	**71**	**188,051**	**71**	**-12,632**	-	**+4,979**	**+0**	**180,398**	**71**	**-7,653**
Special Initiatives - 2023	**2,130**	**-**	**2,130**	**-**	**+0**	**-**	**-2,130**	**+0**	**-**	**-**	**-2,130**
Total, SIR w/o Supplementals	**1,497,178**	**4,544**	**1,497,178**	**4,544**	**+8,799**	-	**+72,321**	**+135**	**1,578,298**	**4,679**	**+81,120**
2022 Bipartisan Infrastructure Law (P.L. 117-58)	**68,655**	**54**	**68,655**	**54**	**+0**	**-**	**+0**	**-24**	**68,655**	**30**	**+0**
2023 Disaster Supplemental (P.L. 117-328)	**41,040**	**42**	**-**	**42**	**+0**	**-**	**+0**	**-42**	**-**	**-**	**+0**
TOTAL, SIR w/ Supplementals	**1,606,873**	**4,640**	**1,565,833**	**4,640**	**+8,799**	-	**+72,321**	**+69**	**1,646,953**	**4,709**	**+81,120**

U.S. Geological Survey

Surveys, Investigations, and Research
Justification of Fixed Costs Changes

(Dollars In Thousands)

Fixed Cost Element	2024 Annualized CR or Change	2024 Annualized CR to 2025 Request Change	Description
Change in Number of Paid Days	+3,110	0	Total paid days for FY 2025 is 261 (2088 hours) which is the same number of days as FY 2024.
Pay Raise	+39,210	+21,294	The President's Budget for 2025 includes one quarter (October-December 2024) of the 5.2% pay raise for 2024 and three quarters (January-September 2025) of the estimated 2.0% pay raise for 2025.
FERS Employer Contribution Increase	0	0	The estimates do not reflect increases to the employer contribution for FERS or Law Enforcement FERS for FY 2025.
Departmental Working Capital Fund (WCF)	+2,269	+530	The estimates reflect final decisions of the Working Capital Fund Consortium on the FY 2025 Working Capital Fund Central Bill.
Workers' Compensation Payments	-122	-65	The amount reflects final chargeback costs of compensating injured employees and dependents of employees who suffer accidental death while on duty. This amount reflects the final Workers Compensation bill for 2025 payable to the Department of Labor, Federal Employees Compensation Fund, pursuant to 5 U.S.C. 8147(b) as amended by Public Law 94-273.
Unemployment Compensation Payments	+4	-48	The amount reflects projected changes in the costs of unemployment compensation claims to be paid to the Department of Labor, Federal Employees Compensation Account, in the Unemployment Trust Fund, pursuant to Public Law 96-499. This estimate reflects an applied annual inflation factor of 3.0% to the 5-year average of actuals between 2018-2022.
GSA and Non-GSA Rents	+934	-12,912	This estimate reflects the FY 2025 President's Budget Exhibit 54s as submitted. The amounts reflect changes in the costs payable to General Services Administration (GSA) and others for office and non-office space as estimated by GSA, as well as the rental costs of other currently occupied space. These estimates reflect MIB rent, Security, Federal Reserve Parking, and Operations and Maintenance, distributed by bureau and office, based upon OFAS provided MIB occupancy levels. Costs of mandatory office relocations (i.e., relocations in cases where due to external events there is no alternative but to vacate the currently occupied space) are also included.
Baseline Adjustments for O&M Increases	+3,761	0	This adjustment captures the associated increase to baseline operations and maintenance requirements resulting from movement out of GSA or direct-leased (commercial) space into Bureau-owned space. During these transitions, bureaus often encounter an increase to baseline O&M costs not otherwise captured in fixed costs. This category of funding properly adjusts the baseline fixed cost amount to maintain steady-state funding for these requirements.
Total, Account 2025 Fixed Costs		+8,799	

U.S. Geological Survey
Surveys, Investigations, and Research
Justification of Internal Realignments

(Dollars In Thousands)

Internal Realignments and Non-Policy/Program Changes (Net-Zero)	BY (+/-)	Description
Mineral Resources Program - National Minerals Information Center	+19,061	The USGS intends to request that the Chief Statistician of the United States within the Office of Management and Budget designate the National Minerals Information Center as a Recognized Statistical Unit, as described in 44 U.S.C. 3563. To facilitate the designation, the USGS requests that the Unit's budget be identified as a stand-alone sub-account within the Mineral Resources Program budget for increased budgetary transparency.
Mineral Resources Program - Mineral Resources Research, Surveys, and Assessments	+51,794	
Mineral Resources Program	-70,855	
Ecosystems Change Research Program	+20,066	The USGS proposes to separate the Ecosystems Change Research Program (formerly Land Change Science Program) and the National & Regional Climate Adaptation Science Centers (NRCASC) into two independent programs. The programs are currently combined within the Climate Adaptation Science Centers and Land Change Science Program but have been operating independently. Program and budget clarity is needed to demonstrate how the climate adaptation science conducted by the NRCASCs is different from, but complementary to, the research in the Land Change Science Program.
National and Regional Climate Adaptation Science Centers	+63,115	
Climate Adaptation Science Center and Land Change Science Program	-83,181	
Critical Minerals Supply Chain Analysis and Forecasting	+2,865	The USGS proposes to transfer a total of $2,865,000 within the Mineral Resources Program. This funding level allows the USGS to continue critical mineral supply chain forecasting and scenario analysis, which informs billions of dollars in Federal and private sector investments.
Supply Chain Research for Emerging Technologies	-1,670	
Critical Minerals - Forecasting	-1,195	
Net Account Total, Internal Transfers	0	

Account and Sundry Exhibits

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Account and Sundry Exhibits

Employment Summary

SURVEYS, INVESTIGATIONS, AND RESEARCH

Identification Code 14-0804-0-1-306		2023 Actual	2024 Estimate	2025 Estimate
	Direct:			
1001	Civilian full-time equivalent employment	4,640	4,640	4,709
	Reimbursable:			
2001	Civilian full-time equivalent employment	3,130	3,130	3,130
	Allocation account:			
3001	Civilian full-time equivalent employment	52	52	52

CONTRIBUTED FUNDS

	Identification Code 14-8562-0-7-306	2023 Actual	2024 Estimate	2025 Estimate
	Direct:			
1001	Civilian full-time equivalent employment	4	4	4

Employee Count by Grade

(Total Employment)

Employee Count by Grade	2023 Actual	2024 Annualized CR Estimate	2025 President's Budget Estimate
Executive Level V	1	1	1
SES	19	19	19
Subtotal	**20**	**20**	**20**
SL – 00	13	15	15
ST – 00	33	41	50
Subtotal	**46**	**56**	**65**
GS/GM – 15	411	411	414
GS/GM – 14	749	750	755
GS/GM – 13	1,059	1,060	1,068
GS – 12	1,696	1,698	1,711
GS – 11	1,378	1,380	1,390
GS – 10	154	154	155
GS – 9	948	949	956
GS – 8	211	211	213
GS – 7	598	598	603
GS – 6	280	281	283
GS – 5	324	324	327
GS – 4	60	60	60
GS – 3	42	42	42
GS – 2	5	5	5
GS – 1	2	2	2
Subtotal	**7,916**	**7,924**	**7,986**
Other Pay Schedule Systems	277	277	277
Total employment (actual/estimate)	**8,259**	**8,277**	**8,348**

Section 403 Compliance

This section describes details related to any assessments to, or within, the USGS to support bureau-wide services and functions to support governmentwide, DOI-wide, bureau-wide and regional administrative functions, headquarters, and central operations.

External Administrative Costs	2025 Estimate ($000)
Department of the Interior Working Capital Fund and Payments to Other Federal Agencies	
WCF Centralized Billings	*$23,593*
WCF Direct Billings	*$16,412*
Worker's Compensation Payments	*$1,745*
Unemployment Compensation Payments	*$552*
GSA Rental Payments	*$87,415*
Bureau Administrative Costs	
Shared Program Costs	*$43,000*
Bureau-Level Costs	*$37,000*
Reimbursable Overhead	*$57,000*

Department of the Interior Working Capital Fund and Payments to Other Federal Agencies

The Department's Working Capital Fund was established pursuant to 43 U.S.C. 1467, to provide common administrative and support services efficiently and economically at cost. The Fund is a revolving fund, whereby capital is expended to provide services for customers who pay for the services. Customers consist of the Department's bureaus and offices, as well as other Federal agencies. Through using centrally provided services, the Department standardized key administrative areas, such as commonly used administrative systems, support services for those located in and around the Main Interior building complex, and centrally managed departmental operations that are beneficial to the bureaus and offices.

Centralized billing is used whenever the product or service being provided is not severable or it is inefficient to bill for the exact amount of product or service being procured. Customers are billed each year using a pre-established basis that is adjusted annually to reflect change over time. These bills are paid for by both the Administrative and Management and the Information Services subactivities within Science Support, and payment may be adjusted accordingly between these lines during the year of execution based on the enacted appropriation.

Direct billing is used whenever the product or service provided is severable but is executed through a time and materials reimbursable support agreement or similar contractual arrangement.

More information related to payments to other Federal agencies can be found in the USGS Account chapter under the fixed cost exhibit.

Bureau Administrative Costs

Shared Program Costs

The USGS maintains an estimated (up to) five percent of its budget submission for other bureau-wide support and science-related activities. These costs are in addition to what may be needed to adequately pay for science support. These funds are used for initiatives that may be unfunded mandates, are crosscutting in nature, or respond to new bureau priorities and emerging scientific issues.

The funding for the initiatives in the Shared Program Costs are assessed at the budget activity level, based upon one of two methodologies: proportionately based on total appropriated funds for the mission area; or proportionately based on total funds for the mission area, including reimbursable funding sources. The methodology used is tied to the nature of the initiative. For instance, an initiative that is crosscutting across all the mission areas but is purely an Interior priority (one in which an external partner is not a stakeholder, nor receives direct benefit of the service) would receive its funding based upon a calculation on appropriated funds only. Conversely, an initiative where all customers of the USGS either directly or indirectly receive benefit, such as information technology compliance or security upgrades, would be assessed proportionately to each of the mission areas based upon all funding sources, both appropriated and reimbursable. The initiatives on the Shared Program Cost Chart are vetted each year with the Executive Leadership Team of the USGS.

Bureau-Level Costs

The USGS manages overhead costs at two levels—the bureau and science center. Bureau-level costs include headquarters executive, managerial, supervisory, administrative, and financial functions, and bureau-wide systems. Funding appropriated to the Science Support budget subactivities pays much of the bureau-level costs. For this reason, bureau-level costs collected on reimbursable support agreements are deposited within Science Support program areas as well. Additionally, the USGS may allocate costs for these activities typically funded out of the Science Support program to the direct appropriation for those programs when those costs exceed amounts allocated to Science Support subactivities in the appropriation. At the 2024 CR level, these costs are approximately three and a half percent of the science program appropriations. Taken as a whole, costs to support science mission areas are estimated at about 12 percent of the USGS operating budget and up to 12 percent of appropriated programmatic funding could be used to adequately pay for science support costs. These costs may be considered shared program costs.

At the science center level, as there generally is not a direct appropriated funding source to pay the local overhead (common services) costs, both the direct appropriated and reimbursable funding are assessed to cover science center-level costs. Science center common services costs include center costs that are not directly attributable to a specific activity or project, such as managerial, supervisory; administrative; and financial functions and related systems; as well as costs incidental to providing services and products, such as postage, training, miscellaneous supplies, and materials. During 2023, the cost for the local overhead totaled $203 million. The USGS expects approximately the same levels for 2024 and 2025.

Reimbursable Overhead

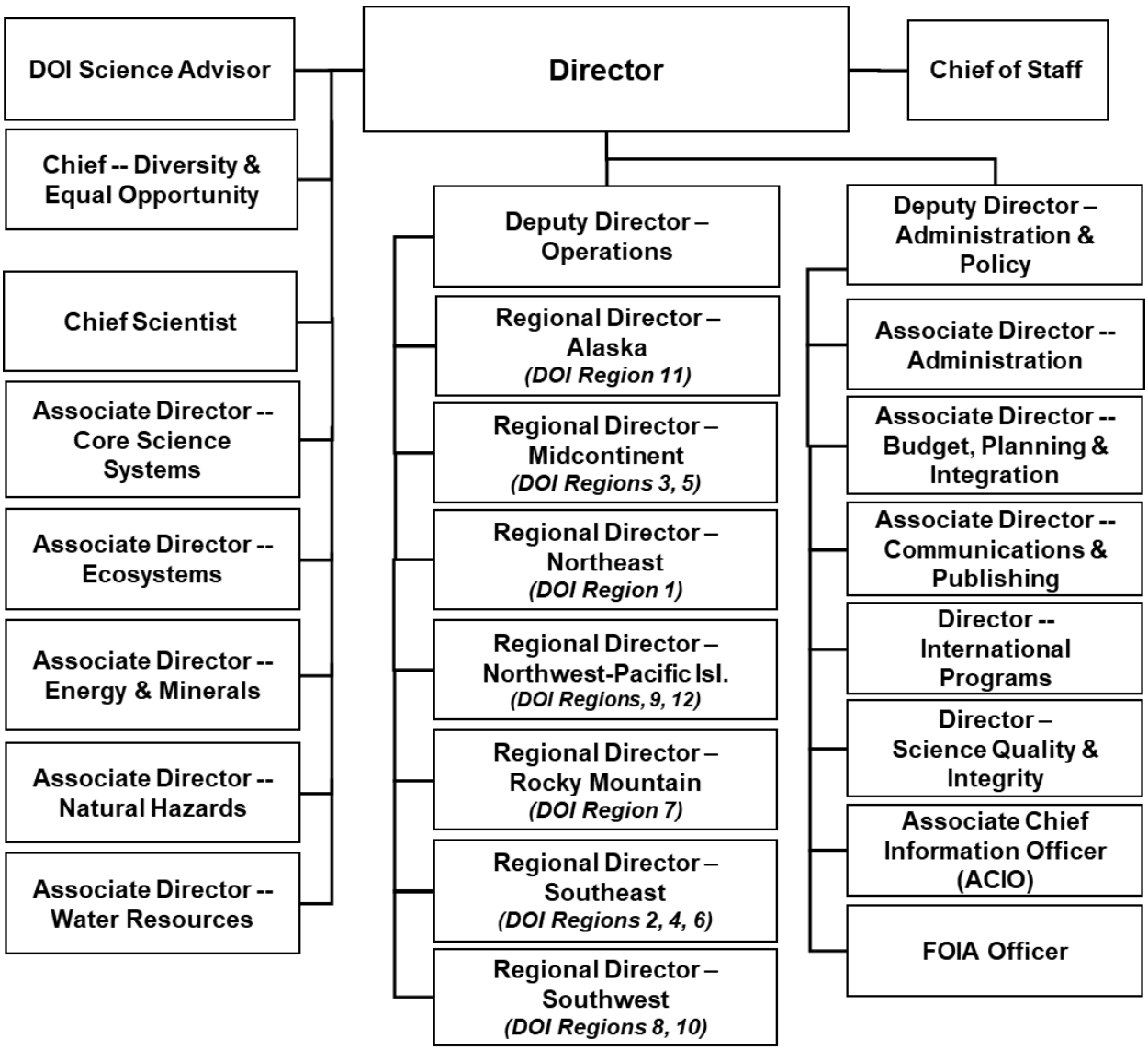
The USGS also assesses a bureau overhead rate, estimated to remain at 12 percent, on reimbursable work from non-Interior customers to recoup their share of bureau-level costs. In some cases, the USGS assesses a special or reduced rate when it can be demonstrated that indirect costs are substantially and consistently less than the norm and the amount collected covers the full costs, such as with pass-through funding where the USGS does not perform any of the actual work.

In recognition of the USGS role as the science bureau for the Department of the Interior, the USGS is continuing to give Interior bureaus and offices a "preferred" customer rate on overhead charges for a significant portion of reimbursable work, to the extent that cost share funds are available within the USGS budget to cover the uncovered overhead costs. Cost Centers may charge up to 22 percent for the preferred rate in FY 2024, which will cover both bureau and center-level common services costs. This is an increase from the 15 percent that USGS has had in place for the past 20 years. In the intervening years, the gap between the preferred rate and actual center-level common services costs has grown, requiring an increasing diversion of directly appropriated funding. Of the 22 percent, 7 percent will be applied to bureau costs (the same as in previous years), and the remaining 15 percent is applied to common services costs. USGS has communicated this change with the other DOI bureaus and will continue to coordinate additional changes that may be necessary in future years.

The Associate Director for Administration establishes the USGS bureau special rate for each fiscal year. The special rate for 2024 is estimated to remain at three percent. Cost centers do not charge more than the bureau special rate for facilities-related costs or their standard common services rate when funding is approved for a bureau-level special rate. Special rates are applied under the following circumstances:

- When the USGS receives funds from a non-USGS organization and awards a grant to a third-party entity.
- When the USGS receives funds from one or more non-USGS organizations to support, under USGS leadership, a strategic science objective that includes the USGS passing through funds to one or more third-party entities.
- When the USGS receives funds from a non-USGS organization for the purpose of the customer acquiring services through the Cartographic Services or the Remotely Sensed Data Contracts. The special rate helps encourage other Federal agencies to use these contracts for cartographic services and remotely sensed data, rather than establishing and managing their own contracts, and ensures greater data consistency using common service providers.
- Equipment purchase required for new project; cost of the equipment is a major portion of the total agreement funds; and equipment will be USGS property.
- Interagency detail work assignments of a USGS employee to a non-USGS agency when space and administrative support are provided at no charge.
- Funds received with specific legal authority to award a grant which will be transferred to a third-party entity.

USGS Organizational Chart



Bipartisan Infrastructure Law (BIL) FY 2025 Spend Plan

Introduction

President Biden signed the Bipartisan Infrastructure Law (BIL) on November 15, 2021, providing a once-in-a-generation investment in the Nation's infrastructure and economic competitiveness. This landmark investment will rebuild America's critical infrastructure, tackle the climate crisis, advance environmental justice, and create good-paying union jobs. By addressing long-overdue infrastructure needs and strengthening our resilience to the changing climate, this investment in our communities across the country will grow the economy sustainably and equitably to help all Americans get ahead.

Funding from the BIL is provided to USGS as emergency appropriations and is available for obligation with various periods of availability. The enacted amounts are shown in the following section.

BIL Summary

The Bipartisan Infrastructure Law provides USGS a total of $510.7 million over a period of 5 years to map and interpret mineral resources data, preserve data and samples relevant to critical mineral resources, and build a replacement facility for the USGS energy and minerals research center in Golden, CO.

USGS Bipartisan Infrastructure Legislation (BIL) Funding by Year of Availability
Enacted Amounts Available ($000)

Account/Program/Activity	FY 2022	FY 2023	FY 2024	FY 2025	Total
Program					
USGS Energy and Minerals Research Facility	167.0	0.0	0.0	0.0	167.0
National Geological and Geophysical Data Preservation Program (NGGDPP)	8.7	5.0	5.0	5.0	23.7
Earth Mapping Resources Initiative (Earth MRI)	64.0	64.0	64.0	64.0	256.0
Total, BIL Funding	**239.7**	**69.0**	**69.0**	**69.0**	**446.7**

Program Summaries

The USGS plays an essential role in providing a broad range of science to other Federal, State, and local government agencies, Tribal communities, and the public. The USGS plans to make historic investments in science with the following projects:

USGS Energy and Minerals Research Facility

Funding has been available for obligation since 2022 and is available until expended to support the construction of a new Federally-owned building for mineral and energy science on the Colorado School of Mines (CSM) campus. The new building will be adjacent to the existing USGS Geologic Hazards Science Center (home to the National Earthquake Information Center), also on the CSM campus. The new building is intended to house the USGS Geology, Geophysics, and Geochemistry (G3) and Central Energy Resources (CER) Science Centers and allow for co-location with CSM geoscience faculty, establishing a center of excellence in minerals and energy science and providing opportunities for science collaboration that leverages USGS science; supports the development of science, technology, engineering

and mathematics (STEM) talent by engaging students in USGS science; and expands the diversity of the USGS workforce. Construction is scheduled to be complete in the 4th Quarter of FY 2026.

FY 2023 Activities and Accomplishments

- The USGS transmitted the FY 2023 Annual Report to Congress as required in the statutory language.
- The USGS completed the Environmental Assessment, which evaluated the impacts of the construction and operation of the facility on the natural and human environment.
- CSM and the USGS agreed to and signed the land lease and occupant lease.
- The bureau modified the original Cooperative Agreement to add $150.8 million of BIL funding to finalize EMRF construction documents and begin the construction phase.
- The USGS has obligated 99 percent of the $167.0 million available for spending.
- Following the Environmental Assessment and the executed land lease agreement, CSM started mobilization and early site preparation in September 2023.

FY 2024 Planned Activities and Milestones

- The USGS and CSM hosted a formal groundbreaking event on November 13th at the site location for the new facility.
- The USGS and CSM will review and approve the final project design and proposal to construct the facility in 2024.
- The USGS anticipates construction to begin in Q2 FY 2024.

FY 2025 Planned Activities

- Continue construction and tenant build-out of the new building.

National Geological and Geophysical Data Preservation Program (NGGDPP)

Funding is available for obligation in years 2025 - 2027 to leverage the existing NGGDPP State grants program to provide competitive grants to States quickly and efficiently to preserve and make publicly available historical geological and geophysical data and samples. The USGS provides competitive grants to State Geological Surveys and funds projects executed by USGS and other Department of the Interior bureaus to preserve, modernize, and make publicly available geological and geophysical data and assets.

FY 2023 Activities and Accomplishments

- The USGS awarded 32 competitive grants to State Geological Surveys and funded 24 USGS projects for data preservation activities.
- The bureau also released a Notice of Funding Opportunity for FY 2024 State grant proposals. Proposals were due December 6, 2023.
- The USGS completed the pilot phase of National Index of Borehole Information (NIBI), which compiles metadata on subsurface data and resources into a searchable interface.
- The USGS released the National Index of Borehole Information (NIBI), providing access to information about over 160,000 boreholes.
- The USGS released the Registry of Scientific Collections (ReSciColl), providing access to USGS and State Geological Survey scientific collections and research assets.

FY 2024 Planned Activities and Milestones

- In FY 2024, the BIL appropriates $5.0 million for the National Geological and Geophysical Data Preservation Program project.
- The USGS plans to award competitive grants to State Geological Surveys and DOI bureau projects in May of FY 2024.
- The bureau also released a Notice of Funding Opportunity for FY 2025 state grant proposals, which closed in December 2023.
- The NGGDPP will continue to improve the performance of ReSciColl and NIBI.
- The USGS will continue populating and updating scientific collections in ReSciColl.
- The USGS will continue populating borehole information in NIBI.

FY 2025 Planned Activities

- In FY 2025, the BIL appropriates $5.0 million for the National Geological and Geophysical Data Preservation Program project.
- The USGS plans to award competitive grants to State Geological Surveys and DOI bureau projects in early FY 2025.
- The USGS will continue populating and updating scientific collections in ReSciColl.
- The USGS will continue populating borehole information in NIBI.

Earth Mapping Resources Initiative (Earth MRI)

Funding is available for obligation in years 2025 - 2027 to identify areas with potential critical mineral resources. The BIL directs the USGS to accelerate efforts to carry out the fundamental resources and mapping mission of the USGS by (1) providing integrated topographic, geologic, geochemical, and geophysical mapping; (2) accelerating the integration and consolidation of geospatial and resource data; and (3) providing interpretation of mineral resources data on the subsurface and above ground.

FY 2023 Activities and Accomplishments

- The bureau conducted the 2023 annual Earth MRI workshop with over 30 States and focused on reporting out recent Earth MRI results and prioritizing future mine waste inventory and characterization efforts.
- USGS contracted for 12 new airborne geophysical surveys and 4 lidar surveys.
- The bureau began data collection in cooperation with NASA through hyperspectral surveys over the semi-arid southwestern U.S. to support geologic mapping and legacy mine lands and mine waste studies for critical minerals. Collected over 172,500 sq. km. of hyperspectral and thermal infrared data.
- The USGS completed funding agreements with 14 State Geological Surveys for geologic mapping and acquisition of new geochemical data.
- The USGS launched a new competitive cooperative agreement program with State Geological Surveys for mine waste efforts and established 14 funding agreements with State Geological Surveys to support the inventorying and characterization of mine waste materials.
- The bureau will continue USGS tribal outreach efforts to understand tribal communities' geoscience data needs and leverage Earth MRI to support tribal land management decisions on

natural resources (e.g., minerals, geothermal energy, groundwater), infrastructure, and geologic hazards issues.

FY 2024 Planned Activities and Milestones

- The USGS will augment its geologic and geochemical mapping funding to State Geological Surveys with new agreements for sampling and characterization of legacy mine waste sites.
- The bureau plans to continue to partner with NASA to conduct hyperspectral surveys over the semi-arid southwestern U.S. to support geologic mapping and legacy mine waste studies.
- The USGS will establish new agreements with the State Geological Surveys for geologic and geochemical mapping.
- The USGS will establish new geophysical contracts to acquire geophysical data using FY 2023 BIL funds in FY 2024.
- The bureau will continue USGS tribal outreach efforts to understand tribal communities' geoscience data needs and leverage Earth MRI to support tribal land management decisions on natural resources (e.g., minerals, geothermal energy, groundwater), infrastructure, and geologic hazards issues.
- The USGS conducted the annual Earth MRI workshop in October 2023 with 40 States and focused on reporting out recent Earth MRI results and prioritizing future mapping and mine waste inventory and characterization efforts.

FY 2025 Planned Activities

- The USGS will supplement its geologic and geochemical mapping funding to State Geological Surveys with new agreements for sampling and characterization of legacy mine waste sites.
- The USGS plans to conduct the annual Earth MRI workshop in October 2024 with over 40 States and report out Earth MRI results and prioritize future mapping and mine waste inventory and characterization efforts.
- The bureau will continue USGS tribal outreach efforts to understand tribal communities' geoscience data needs and leverage through Earth MRI to support tribal land management decisions on natural resources (e.g., minerals, geothermal energy, groundwater), infrastructure, and geologic hazards issues.
- The bureau will continue data acquisition of hyperspectral surveys with NASA over the semi-arid southwestern U.S. to support geologic mapping and legacy mine waste studies.

Acronym List

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Acronym List

Abbreviation	Definition
2024 CR	Fiscal Year 2024 Annualized Continuing Resolution
3DEP	3D Elevation Program
3DHP	3D Hydrography Program
3DNTM	3D National Topography Model
ACIO	Associate Chief Information Officer
ANSS	Advanced National Seismic System
BIL	Bipartisan Infrastructure Law (Public Law 117-58; also known as the Infrastructure Investment and Jobs Act)
BIL ER	Bipartisan Infrastructure Law Ecosystems Restoration
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BTISRP	Biological Threats and Invasive Species Research Program
CDC	Center for Disease Control
CMHRP	Coastal/Marine Hazards and Resources Program
CRU	Cooperative Research Units Program
CSS	Core Science Systems
DARPA	Defense Advanced Research Projects Agency
DRB	Delaware River Basin
Earth MRI	Earth Mapping Resources Initiative
ECRP	Ecosystems Change Research Program
EDMAP	Education component of the National Cooperative Geologic Mapping Program
eDNA	Environmental DNA
EDRR	Early Detection and Rapid Response
EH	Environmental Health
EHP	Earthquake Hazards Program
EMA	Ecosystems Mission Area
EMMA	Energy and Mineral Resources Mission Area
EPA	Environmental Protection Agency
EROS Center	Earth Resources Observation and Science Center
ERP	Energy Resources Program
ESA	Endangered Species Act
FEDMAP	Federal mapping component of the National Cooperative Geologic Mapping Program
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FOIA	Freedom of Information Act
FPS	Federal Priority Streamgage
GDA	Geospatial Data Act (P.L. 115-254)
GSN	Global Seismographic Network

Abbreviation	Definition
GWSIP	Groundwater and Streamflow Information Program
HAB	Harmful Algal Blooms
HIF	Hydrologic Instrumentation Facility
HPAI	Highly Pathogenic Avian Influenza
HPC	High Performance Computing
HTC	High Throughput Computing
IK	Indigenous Knowledge
ILRB	Illinois River Basin
Interior	Department of the Interior
IPCC	Intergovernmental Panel on Climate Change
IRA	Inflation Reduction Act (Public Law 117-169)
IWAA	Integrated Water Availability Assessments
IWP	Integrated Water Prediction
IWS	Integrated Water Science Basins
LCMAP	Land Change Monitoring, Assessment, and Projection
LHP	Landslide Hazards Program
LMRP	Land Management Research Program
MRP	Mineral Resources Program
NAS	Nonindigenous Aquatic Species
NCA	National Climate Assessment
NCGMP	National Cooperative Geologic Mapping Program
NEHRP	National Earthquake Hazards Reduction Program
NEIC	National Earthquake Information Center
NEPA	National Environmental Policy Act
NGGDPP	National Geological and Geophysical Data Preservation Program
NGMDB	National Geologic Map Database
NGP	National Geospatial Program
NGWOS	Next Generation Water Observing System
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NLI Program	National Land Imaging Program
NMWA	National Modeled Water Atlas
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCASC	National and Regional Climate Adaptation Science Centers
NSDI	National Spatial Data Infrastructure
NWD	National Water Dashboard
NWIS	National Water Information System
NWQP	National Water Quality Program
OCIO	Office of the Chief Information Officer
PAD-US	Protected Areas Database of the U.S.
PFAS	Per- and Poly-fluoroalkyl Substances
SLI	Sustainable Land Imaging

Abbreviation	Definition
SMRP	Species Management Research Program
SSAR	Science Synthesis, Analysis, and Research Program
STATEMAP	State mapping component of the National Cooperative Geologic Mapping Program
TSJRB	Trinity-San Jacinto River Basin
UAS	Uncrewed Aircraft Systems
UCRB	Upper Colorado River Basin
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USMIN	U.S. Mineral Deposit Database
VHP	Volcano Hazards Program
WAUSP	Water Availability and Use Science Program
WHISPers	Wildlife Health Information Sharing Partnership
WMA	Water Resources Mission Area
WNS	White Nose Syndrome
WRB	Willamette River Basin