



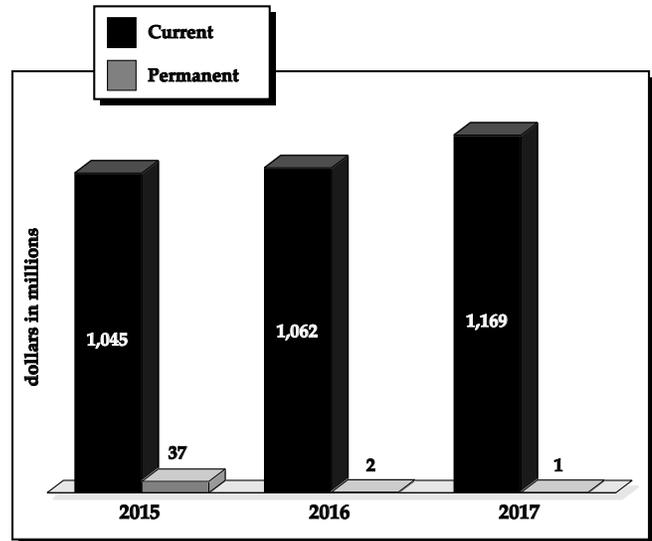
U.S. GEOLOGICAL SURVEY

Mission – The mission of the U.S. Geological Survey is to provide reliable scientific information to describe and understand the Earth, minimize loss of life and property from natural disasters, support the sustainable stewardship of land and water, and manage biological, energy, and mineral resources.

Budget Overview – The 2017 current budget is \$1.2 billion, an increase of \$106.8 million above the 2016 enacted level. The USGS estimates staffing will equal 7,974 full time equivalents in 2017, an increase of 101 FTE from 2016 enacted. The budget reflects the Administration’s commitment to invest in research and development that supports economic growth, balances competing demands on resources, addresses global climate change, and ensures the security and well-being of the Nation. These 2017 investments maximize the value of research, development, and monitoring to support decision making. The budget invests in unique USGS programs that make science usable and useful, particularly in support of Interior’s resource management and trust responsibilities. The budget continues to prioritize investments in drought science and WaterSMART, sustainable energy and mineral resources development, critical landscapes such as the Arctic and sage steppe, science to support coastal communities and protect people from natural disasters, and earth observation tools providing vital knowledge about the planet.

The 2017 USGS budget makes strategic science investments to advance national priorities in land management, support sustainable energy and mineral resource development, improve response to and warning of natural hazards, protect and restore important landscapes and ecosystems, inform sound decisions for water management, and enable communities and the Nation to enhance climate resilience. High-quality science depends on a strong science infrastructure. The budget makes necessary investments to continue the USGS legacy of reliable, valuable scientific information and monitoring. These investments include scientific equipment and supplies; facilities and laboratories; and the administrative support to control and best apply resources. The science infrastructure and services are the backbone of useful

USGS Funding



science production and delivery. The investments in the 2017 budget, as highlighted below, reflect the science and tools needed to address increasingly complex challenges.

Meeting Water Challenges in the 21st Century – The USGS budget provides \$37.1 million for the WaterSMART initiative, an \$18.4 million increase over 2016 enacted level. Responding to drought and managing increasingly limited water supplies is a central concern for land and water management agencies, States, local governments, and Tribes. Within this increase for WaterSMART is \$3.9 million for drought science to quantify water availability, determine how snowmelt factors into the hydrologic cycle, and investigate drought effects on the reproduction and survival of select plant and animal species. In addition, \$4.0 million is to develop methods to assess regional and national water use trends during drought periods that will lead to a near real-time assessment of water use during drought. The WaterSMART initiative also supports decision support systems, provides grants to State Water Resource Agencies to improve their ability to provide base data at the necessary resolution for effective decision making, and creates hydrologic models and databases that factor in economic, environmental, and societal values

U.S. GEOLOGICAL SURVEY FACTS

- Founded by an Act of Congress in 1879.
- Is the Nation's largest water, earth, and biological science and civilian mapping agency.
- Employs over 8,000 scientists, technicians, and support staff working in more than 400 locations throughout the United States.
- With over 2,000 strategic partnerships, USGS is a primary Federal source of science-based information on ecosystem science, climate and land use change, energy and mineral resources, environmental impacts, natural hazards, water use and availability, and updated maps and images for the Earth's features available to the public.
- Generates and maintains data from over 8,100 streamgages and over 2,900 earthquake sensors that are available to the public.
- Over 36 million Landsat satellite scenes have been downloaded by users from the USGS archive since they became available at no charge in 2008, with over 13 million downloaded in 2015 alone.
- The USGS archives provide direct access to air photos dating to 1939 and over 100 other satellite, cartographic, and topographic datasets characterizing the Earth's surface at no cost to the user.

within watersheds, which reflect communities' needs. The USGS budget also provides increases to enhance access and use of water information through the new Open Water Data initiative; improve decisions based on the quality and availability of surface and groundwater resources; better integrate data and models; and enable adaptive management of watersheds to support the resilience of the communities and ecosystems that depend on them.

Supporting Sustainable Energy and Mineral Development – The 2017 USGS budget provides \$39.1 million for the Secretary's Powering Our Future initiative, \$4.3 million above the 2016 enacted level. Program increases across USGS mission areas support science to advance understanding of conventional and unconventional energy resources, critical minerals such as rare earth elements, and the environmental health effects of resource development. These investments include an increase across several programs totaling \$3.6 million to provide decision ready information to support safe and prudent unconventional oil and gas development. Additionally, the budget includes increases for research and development to address the impacts of minerals development, evaluate the mineral flows critical to modern life, and provide information to improve decisions about the availability of lands for uranium mining and uranium's development, mitigation, and reclamation.

Understanding and Managing Landscapes – As climate and landscapes change, balancing priorities becomes more challenging. Those priorities affect ever-larger scales of communities with a wider range of values. The 2017 USGS budget provides \$11.9 million in program increases for science to understand the Nation's landscapes and inform decisions for activities, such as managing public

lands, siting and mitigating the impacts of resource development, and supporting conservation, recreation, and other land uses. This investment in science will increase the understanding of the Nation's critical landscapes, including the sagesteppe, the Arctic, the Columbia River Basin and other priority ecosystems including the Chesapeake Bay, Everglades, Puget Sound, Upper Mississippi River, Great Lakes, California Bay-Delta, and Gulf Coast. This insight will guide better management to maximize society's sustainable return from these landscapes.

For example, in the Arctic, melting glaciers and thawing permafrost are changing the landscapes of coasts, inland forests, and tundra. Requested funding will provide actionable science to communities and land managers about how changes in the Arctic affect the broader physical environment: altering stream flows, disrupting ocean currents and the fisheries that depend on them, and changing ecosystems and the availability of resources. As development continues for many parts of the Arctic, especially in Alaska's Arctic Slope, this investment helps to honor commitments to communities and advance Interior's stewardship responsibilities for resources in an environment of great change.

Improving Response to Natural Hazards – The 2017 budget includes increases of \$17.2 million to improve the USGS's capabilities for natural hazard science and monitoring across USGS mission areas, including \$4.0 million for near real-time assessment of water use during drought. The budget includes \$62.2 million for earthquake hazards, including support for the continued development of an earthquake early warning system on the West Coast, and \$26.2 million for volcano hazards. The budget provides increases to conduct earthquake risk

assessments associated with induced seismicity; expand the Global Seismic Network; improve assessments of coastal vulnerability to storms, erosion, and sea-level rise for communities along the Arctic and Bering Sea coasts and throughout the United States, Territories, and Freely Associated States; support geomagnetic monitoring; improve landslide response; develop drought assessments and a rapid response capacity for wildfires and floods. This science supports better disaster response, enhanced situational awareness, and ultimately greater resilience to natural hazards.

Supporting Community Resilience with Tools to Understand the Planet – The USGS plays a pivotal role in research, providing data and tools on the Earth's systems for Federal, State, tribal, local, and international partners, and the public. These tools and data provide knowledge to better understand, prepare for, and respond to changes in the environment and inform earth science and innovation. The 2017 budget provides increases totaling \$8.5 million to translate science into practical application-ready solutions, tools, and information. This includes \$3.0 million for Landsat products, \$600,000 for Big Earth Data, and \$4.9 million to expand the three-dimensional elevation program, leverage partnerships across the Nation, accelerate Alaskan map modernization, and provide coastal imaging to help communities make infrastructure resiliency investments ahead of future coastal storms.

Continuing Landsat's Benefits for the Nation – The budget funds satellite operations in the Land Remote Sensing program at \$75.2 million, an increase \$17.6 million above 2016. This includes funding for the development, maintenance, and operation of Landsat ground systems and satellite operations and Sentinel-2 data acquisitions. The 2017 budget supports a launch date of 2021 for the Landsat 9 satellite to replace the Landsat 7 satellite, which is reaching the end of its usable life. This launch date will prevent a gap in the eight-day revisit imaging, a fundamental data source needed to address basic science questions and a valuable resource in agriculture, forestry, land use, water resources, and natural resource exploration. Following extensive study, the Administration has established a plan for a long-term Sustainable Land Imaging program to extend the four decade long Landsat series of measurements of the Earth's land surfaces for another two decades. The plan includes development of the Landsat 9 satellite as a rebuild of Landsat 8 technology development and systems innovation to reduce risk in next generation missions, including Landsat 10, and programs to retrieve and disseminate data from the European Space Agency's Sentinel-2 earth observation satellite. The budgets of both USGS and the National Aeronautics and Space Administration provide funding to implement this plan to sustain the Landsat data stream.

Ecosystems Programs – The 2017 budget includes \$173.9 million for the Ecosystems mission area, \$13.7 million above 2016. Through the Ecosystems mission area, the USGS supports societal priorities for fish and wildlife management, water filtration and pollution control, healthy soils, crop pollination, and reduction of the impacts of wildfires and other natural disasters. The 2017 budget for ecosystems includes \$4.0 million for science to support critical new research in the Arctic and sage steppe landscapes. These projects serve local ecosystem management needs and support the communities relying on these landscapes. The budget includes a program increase of \$1.7 million to address research priorities on pollinator health and expand the small group of USGS researchers working on this critical component of agricultural and ecosystem health. A \$2.5 million increase will add to knowledge of ecological flows and the relationship between water quality, quantity, and delivery time, and aquatic communities. The budget includes \$2.5 million for better tools to detect and control invasive species, particularly new and emerging invasive species. Other program increases totaling \$2.3 million, include research on the effects of unconventional oil and gas development, Great Lakes fisheries assessments, drought science, renewable energy, support for developing the next generation of American scientists, and developing better capabilities to respond to catastrophic wildfires.

Climate and Land Use Change Programs – The 2017 budget provides a total of \$171.4 million for Climate and Land Use Change, an increase of \$31.5 million above 2016. The proposed budget for the Climate Variability subactivity is \$63.0 million, an increase of \$5.7 million above the 2016 enacted level. This subactivity provides practical scientific information to inform resilient and adaptive natural resource decisions and advance implementation of the President's Climate Action Plan. The budget funds the National Climate Change and Wildlife Science Center and the eight regional Department of the Interior Climate Science Centers at \$30.9 million, an increase of \$4.5 million above 2016. The increase includes \$1.5 million to establish the Great Lakes Climate Science Center, \$1.0 million for drought research as part of WaterSMART, \$1.4 million for tribal climate science partnerships, and \$500,000 to research glacier loss in the Arctic. The budget funds the Climate Research and Development program at \$22.7 million, a program increase above 2016 of \$1.1 million for drought research as part of WaterSMART. The 2017 budget also provides \$9.4 million to maintain Carbon Sequestration at the 2016 level.

The 2017 budget request for the Land Use Change subactivity is \$108.4 million, \$25.8 million above the 2016 enacted level. This subactivity ensures that earth observation imagery collected via satellite is accessible to users

and provides analyses of these data to quantify rates of land use change, identifies key driving forces, and forecasts future trends of landscape change. The 2017 budget provides a program increase of \$17.6 million for satellite operations, including \$15.4 million for Landsat 9 ground systems development and \$2.2 million for Sentinel-2 Earth observation data acquisitions. Program increases include \$2.1 million for land use data related to WaterSMART, including drought science and improvement of water management across the Nation, \$3.0 million in the Land Remote Sensing program for Landsat science products for climate and natural resource assessments, \$1.9 million to increase understanding of land changes in the Arctic, \$500,000 to assist decision makers with coastal resiliency data and imagery, and \$600,000 for the Big Earth Data Initiative to advance landscape level understanding.

Energy and Mineral Resources, and Environmental Health Programs—The 2017 budget includes \$99.5 million for Energy and Mineral Resources, and Environmental Health, \$5.0 million above the 2016 enacted level. The proposed budget for the Mineral and Energy Resources subactivity is \$74.9 million, an increase of \$1.9 million above the 2016 level. This subactivity includes programs that conduct research and assessments on the location, quantity, and quality of the Nation’s mineral and energy resources and produce science and information to support the safe and environmentally responsible development of these resources. The budget provides \$1.0 million in program increases in Mineral Resources to identify and evaluate new sources of critical minerals, as well as continue critical minerals lifecycle work and criticality analysis for a number of mineral commodities, and \$559,000 for research and development to address the environmental impacts of minerals development. Program increases in Energy Resources include \$1.0 million for unconventional oil and gas research, \$229,000 to support alternative energy permitting on Federal lands for geothermal energy, and \$211,000 to evaluate the benefits of an ecosystem services approach to support informed decision making on coastal resiliency and green infrastructure investment. Reductions in lower priority activities within these programs partially offset the increases.

The 2017 budget for the Environmental Health subactivity is \$24.6 million, \$3.1 million above the 2016 enacted level. This subactivity conducts research on the impacts of human activities and naturally occurring processes that introduce contaminants, toxins, and pathogens into the environment and threaten human, animal, and ecological health. Program increases include \$1.2 million to study the human health and environmental impacts potentially associated with unconventional oil and gas development, \$2.0 million to study the environmental impacts of uranium mining in the Grand Canyon, \$1.3

million for a post-hurricane/storm contaminant monitoring network along the Northeast coast, and \$100,000 to study the effects of pesticides and mercury on the fish and wildlife in the Columbia River Basin. Reductions in lower priority activities within this subactivity partially offset the increases.

Natural Hazards Programs—The 2017 budget provides \$149.7 million for Natural Hazards, \$10.7 million above the 2016 enacted level. This activity provides scientific information and tools to help understand and respond to hazards such as volcanoes, earthquakes, tsunamis, solar flares, and landslides with a goal of reducing potential fatalities, injuries, property damage, and other social and economic effects. This activity also includes efforts to characterize and assess coastal and marine processes, conditions, vulnerability, and change. The budget continues funding of \$8.2 million in the Earthquake Hazards program for West Coast earthquake early warning and \$3.0 million in the Volcano Hazards program to improve disaster response. Within the Earthquakes Hazard subactivity, the budget provides an increase of \$800,000 for seismic networks in the eastern and central United States and \$700,000 for research into induced seismicity from hydraulic fracturing. Program increases in Coastal and Marine Geology include \$2.1 million for resilient coastal landscapes and communities and \$3.5 million for coastal resiliency science and tools to support vulnerable Arctic and island communities plan and prepare for the impacts of climate change. This work will be coordinated with the Arctic and Pacific Climate Science Centers, Landscape Conservation Cooperatives, Bureau of Indian Affairs, Office of Insular Affairs, and other partners. Additional increases include \$1.7 million within the Geomagnetism program for improved monitoring of solar flares and other threats to communications, commerce, and the power grid; \$500,000 within the Landslide Hazards program to improve disaster response; and \$860,000 for deployment of seismic sensors procured by the Department of Energy.

Water Resources Programs—The 2017 budget includes \$228.0 million for Water Resources, \$17.3 million above the 2016 enacted level. Water Resources programs collect and deliver hydrologic data, model and analyze hydrologic systems, and conduct research and development leading to new understanding of and methods for gathering data. A national network of streamgages, wells, and monitoring sites supports the activities; and the program leverages funds from State, tribal, and local partners.

The request for Water Availability and Use Science Program is \$54.4 million, \$12.3 million above the 2016 enacted level. Program increases include \$10.2 million for WaterSMART, including \$4.0 million for near real-time assessment of water use during drought, \$750,000 to

collaborate with other Federal agencies to accelerate the development of a nationwide hydrologic model, \$400,000 to provide streamflow statistics in the Streamstats application for three additional States, and \$4.0 million for water use information and research. Also proposed is an increase of \$2.0 million for research into Arctic specific questions, including the effect of permafrost thaw on surface water and mercury transport.

The budget funds the Groundwater and Streamflow Information Program at \$73.0 million, an increase of \$1.4 million over the 2016 enacted level. Program increases include \$700,000 for the expanded use of flood inundation mapping and rapid deployable streamgages and \$500,000 to work closely with tribal leaders to conduct water resource investigations to address water rights, water supply, flood predictions, contamination, and healthy ecosystems.

The National Water Quality Program is funded at \$94.1 million, an increase of \$3.5 million over the 2016 enacted level. The request includes program increases of \$450,000 for unconventional oil and gas research, \$717,000 for enhanced cooperative activities and urban waters studies, and \$1.9 million in support of the National Water Quality Assessment Project's Cycle 3.

The Water Resources Research Act Program is funded at the same level as the 2016 enacted level, \$6.5 million.

Core Science Systems Programs – The 2017 budget provides \$118.4 million for Core Science Systems, \$6.8 million above the 2016 enacted level. This activity provides the Nation with access to science, information, data, and geospatial frameworks needed to manage natural resources and plan for and respond to natural hazards. Geospatial data in The National Map, together with geological and biological maps and data archives, provide critical information about the Earth, its complex processes, and natural resources.

The 2017 budget for the National Geospatial Program is \$69.0 million, with program increases of \$5.9 million above the 2016 enacted level. Program increases of \$1.5 million for 3-D elevation Alaska mapping and \$2.4 million for the 3-D elevation program will support the national effort to build a modern elevation foundation nationwide for stronger, more resilient communities. Additional increases include \$1.0 million for the National Hydrography Database in WaterSMART, \$500,000 to use LIDAR data for landscape level assessments in the Chesapeake Bay, and \$500,000 to use LIDAR data for improving disaster response regarding coastal infrastructure.

The budget for National Cooperative Geologic Mapping provides \$24.5 million to maintain these programs at the 2016 level, excluding fixed cost increases.

The 2017 budget for Science Synthesis, Analysis, and Research is \$24.9 million, an increase of \$631,000 over 2016, with program increases of \$350,000 for native pollinator activities and \$200,000 for drought studies in WaterSMART.

Science Support Programs – The 2017 budget request includes \$110.6 million for Science Support, \$5.0 million above the 2016 enacted level. This activity funds the executive, managerial, and accounting activities, information technology, and bureau support services of USGS. These services underpin the work of USGS by providing the business supports that enable the scientific achievements. The 2017 budget includes program increases in Administration and Management of \$500,000 to enhance the Mendenhall post-doctoral program, \$300,000 to support tribal science coordination, \$1.0 million to enhance youth and science education, \$200,000 for engaging and mentoring youth in underserved communities in earth and biological sciences through outreach activities and science camps, and \$200,000 for science coordination. The budget also proposes increases of \$2.6 million to enhance science support by increasing the USGS capacity for technology transfer, assisting with development of cooperative research agreements, and providing other support to advance critical science mission goals. This amount includes \$620,000 in Information Services.

Facilities – The 2017 budget provides \$117.3 million for Facilities, \$16.8 million above the 2016 enacted level. This activity provides safe, functional workspace, laboratories, and other facilities needed to accomplish the USGS scientific mission. The budget provides program increases of \$2.7 million to enhance operation and maintenance efficiencies in the real property portfolio, \$2.0 million for sustainability investments to meet energy reduction and environmental performance requirements in Executive Order 13514, and \$10.9 million to reduce the facilities footprint of USGS nationwide by consolidating and improving the efficiency of space and real property. Through these cost savings and innovation plan efforts, USGS has cumulatively reduced its footprint by over 615,000 rentable square feet from 2012 through 2015. In 2016 and 2017, USGS anticipates an additional reduction of 140,000 rentable square feet, bringing the overall footprint reduction to 755,000 rentable square feet. Over the next four to six years, investments to reduce the footprint will pay for themselves by lowering USGS rental and maintenance costs.

Fixed Costs – Fixed costs of \$4.7 million are fully funded.

SUMMARY OF BUREAU APPROPRIATIONS

(all dollar amounts in thousands)

Comparison of 2017 Request with 2016 Enacted

	2016 Enacted		2017 Request		Change	
	FTE	Amount	FTE	Amount	FTE	Amount
Current						
Surveys, Investigations, and Research.....	4,975	1,062,000	5,118	1,168,803	+143	+106,803
Subtotal, Appropriations.....	4,975	1,062,000	5,118	1,168,803	+143	+106,803
Permanent						
Operations and Maintenance of Quarters.....	0	56	0	53	0	-3
Contributed Funds.....	5	1,808	5	902	0	-906
Subtotal, Permanent.....	5	1,864	5	955	0	-909
Reimbursable, Allocation, and Other						
Reimbursements.....	2,702	0	2,702	0	0	0
Allocation.....	80	0	38	0	-42	0
Working Capital Fund.....	111	0	111	0	0	0
Subtotal, Reimbursable, Allocation, and Other..	2,893	0	2,851	0	-42	0
TOTAL, U. S. GEOLOGICAL SURVEY.....	7,873	1,063,864	7,974	1,169,758	+101	+105,894

HIGHLIGHTS OF BUDGET CHANGES

By Appropriation Activity/Subactivity

APPROPRIATION: Surveys, Investigations, and Research

	2015 Actual	2016 Enacted	2017 Request	Change
Ecosystems				
Status and Trends	20,473	20,473	22,267	+1,794
Fisheries	20,886	20,886	24,083	+3,197
Wildlife	45,257	45,757	46,125	+368
Environments.....	36,224	38,415	43,352	+4,937
Invasive Species.....	16,830	17,330	19,877	+2,547
Cooperative Research Units	17,371	17,371	18,234	+863
Subtotal, Ecosystems	157,041	160,232	173,938	+13,706
Climate and Land Use Change				
Climate Variability	57,589	57,289	63,003	+5,714
Land Use Change.....	78,386	82,686	108,441	+25,755
Subtotal, Clim. and Land Use Chge.	135,975	139,975	171,444	+31,469
Energy and Minerals Resources, and Environmental Health ^{1/}				
Mineral and Energy Resources	70,826	73,066	74,923	+1,857
Environmental Health	21,445	21,445	24,560	+3,115
Subtotal, Energy and Minerals and Environmental Health	92,271	94,511	99,483	+4,972
Natural Hazards				
Earthquake Hazards	59,503	60,503	62,196	+1,693
Volcano Hazards	25,121	26,121	26,238	+117
Landslide Hazards.....	3,485	3,538	4,054	+516
Global Seismographic Network.....	4,853	6,453	7,322	+869
Geomagnetism.....	1,888	1,888	3,598	+1,710
Coastal and Marine Geology	40,336	40,510	46,293	+5,783
Subtotal, Natural Hazards	135,186	139,013	149,701	+10,688
Water Resources ^{1/}				
Water Availability and Use Science	40,919	42,052	54,388	+12,336
Groundwater and Streamflow Info.	[69,707	71,535	72,957	+1,422
National Water Quality	94,141	90,600	94,147	+3,547
Water Resources Research Act Prog	6,500	6,500	6,500	0
Subtotal, Water Resources.....	211,267	210,687	227,992	+17,305
Core Science Systems				
Science Synthesis, Analysis, and Research Program.....	24,299	24,299	24,930	+631
National Coop. Geologic Mapping Program	24,397	24,397	24,486	+89
National Geospatial Program.....	58,532	62,854	68,979	+6,125
Subtotal, Core Science Systems	107,228	111,550	118,395	+6,845
Science Support				
Administration and Management	84,192	81,981	86,319	+4,338
Information Services.....	21,419	23,630	24,273	+643
Subtotal, Science Support	105,611	105,611	110,592	+4,981

^{1/} The budget for both the Energy and Minerals Resources, and Environmental Health activity and the Water Resources activity was restructured in 2016. The 2015 numbers are presented in the new structure for comparison.

APPROPRIATION: Surveys, Investigations, and Research (continued)

	2015 Actual	2016 Enacted	2017 Request	Change
Facilities				
Rental Payments and Operations and Maintenance	93,141	93,141	109,978	+16,837
Deferred Maintenance and Capital Improvements	7,280	7,280	7,280	0
Subtotal, Facilities	100,421	100,421	117,258	+16,837
TOTAL APPROPRIATION	1,045,000	1,062,000	1,168,803	+106,803

Detail of Budget Changes

	2017 Change from 2016 Enacted		2017 Change from 2016 Enacted
TOTAL APPROPRIATION	+106,803		
Ecosystems	+13,706	Landsat 9 Ground Systems Development	+15,400
Status and Trends	+1,794	Sentinel-2 Data Acquisition	+2,200
Pollinators	+1,705	Landsat Science Products for Climate and	
Fixed Costs	+89	Natural Resources Assessments	+2,992
Fisheries	+3,197	WaterSMART	
Great Lakes Fisheries Assessments	+250	Drought	+250
Unconventional Oil and Gas Research	+350	New Tools and Models to Better	
WaterSMART - Ecological Flows	+2,500	Manage Water Nationwide	+1,000
Fixed Costs	+97	Remote Sensing	+800
Wildlife	+368	Fixed Costs	+156
All-of-the-Above Energy - Renewable Energy		Energy and Minerals and Environmental Health ..	+4,972
Wind and Solar	+150	Mineral and Energy Resources	+1,857
Fixed Costs	+218	Alternative Energy Permitting on Fed. Lands	+229
Environments	+4,937	Ecosystem Services	+211
Critical Landscapes		Critical Minerals and Materials Flow	+1,022
Arctic	+1,000	Geophysical and Remote Sensing Activities ...	-1,500
Sage Steppe	+3,000	Unconventional Oil and Gas Research	+975
Natural Hazard Science for Disaster Reponse		Environmental Impacts of	
Wildfire Disaster Response	+500	Minerals Development	+559
WaterSMART - Drought	+300	Fixed Costs	+361
Fixed Costs	+137	Environmental Health	+3,115
Invasive Species	+2,547	Critical Landscapes - Columbia River	+100
New and Emerging Invasives	+2,500	Environmental Impacts of Uranium	
Fixed Costs	+47	Mining in the Grand Canyon	+2,023
Cooperative Research Units	+863	Fate and Transport of Contaminants	
CRU Enhanced Support and Scientists for		in the Subsurface	-800
Tomorrow	+750	Unconventional Oil and Gas Research	+1,150
Fixed Costs	+113	Emerging Contaminants and Chem. Mixtures	-750
Climate and Land Use Change	+31,469	Resilient Coastal Landscapes and	
Climate Variability	+5,714	Communities Contaminant Network	
Critical Landscapes - Arctic	+500	Along NE Coast	+1,300
Tribal Climate Science Partnerships	+1,411	Fixed Costs	+92
Great Lakes Climate Science Center	+1,500	Natural Hazards	+10,688
WaterSMART - Drought	+2,155	Earthquake Hazards	+1,693
Fixed Costs	+148	Central/Eastern U.S. Seismic Net. Adoption ..	+800
Land Use Change	+25,755	Unconventional Oil and Gas Res. - Induced	
Big Earth Data Cube	+600	Seismicity Earthquake Risk Assessments ...	+700
Resilient Coastal Landscapes and		Fixed Costs	+193
Communities - Imagery Datasets and		Volcano Hazards	+117
Analytical Tools for Coastal Analysis	+500	Fixed Costs	+117
Critical Landscapes - Arctic	+1,857	Landslide Hazards	+516

Detail of Budget Changes
Surveys, Investigations, and Research (continued)

	2017 Change from <u>2016 Enacted</u>		2017 Change from <u>2016 Enacted</u>
Natural Hazard Science for Disaster		Core Science Systems.....	+6,845
Response Landslide Response.....	+500	Science Synthesis, Analysis, and Research.....	+631
Fixed Costs.....	+16	Pollinators.....	+350
Global Seismographic Network.....	+869	WaterSMART - Drought.....	+200
Primary Sensor Deployment.....	+860	Fixed Costs.....	+81
Fixed Costs.....	+9	National Cooperative Geologic Mapping.....	+89
Geomagnetism.....	+1,710	Fixed Costs.....	+89
Natural Hazard Science for Disaster Response		National Geospatial Program.....	+6,125
Improved Geomagnetic Monitoring.....	+1,700	3D Elevation	
Fixed Costs.....	+10	Alaska Mapping and Map Modernization .	+1,500
Coastal and Marine Geology.....	+5,783	Coastal LIDAR.....	+500
Scenarios for Arctic Actions to Address		National Enhancement.....	+2,387
Imminent Coastal Impacts.....	+3,500	National Hydrography Database and	
Building Landscape Level Resilience		Landscape Level Assessments -	
to Coastal Hazards.....	+2,109	Chesapeake Bay.....	+500
Fixed Costs.....	+174	WaterSMART	
Water Resources.....	+17,305	National Hydrography Database.....	+1,000
Water Availability and Use Science.....	+12,336	Fixed Costs.....	+238
Critical Landscapes - Arctic.....	+1,950	Science Support.....	+4,981
WaterSMART		Administration and Management.....	+4,338
Drought.....	+1,000	Science Coordination.....	+200
National Hydrologic Model.....	+750	Support Science Mission, Infrastructure	
Near Real Time Assessment of		Capacity to Support Science.....	+1,997
Water Use During Drought.....	+4,000	Mendenhall Program Postdocs.....	+500
Streamflow Information.....	+400	Outreach to Underserved Communities.....	+200
Water Use Information.....	+3,000	Tribal Science Coordination.....	+300
Water Use Research.....	+1,000	Youth and Education in Science.....	+1,000
Fixed Costs.....	+236	Fixed Costs.....	+141
Groundwater and Streamflow Information		Information Services.....	+643
Program.....	+1,422	Support Science Mission, Infrastructure	
Natural Hazard Science for Disaster Response		Capacity to Support Science.....	+620
Expand Use of Streamgages.....	+700	Fixed Costs.....	+23
Support Tribal Needs and Decisions.....	+500	Facilities.....	+16,837
Fixed Costs.....	+222	Rental Payments and Ops. and Maintenance.....	+16,837
National Water Quality.....	+3,547	Operations and Maintenance Stewardship.....	+2,712
Enhanced Cooperative Activities and		Reducing the Facilities Footprint.....	+10,902
Urban Waters.....	+717	Sustainability Investments.....	+2,000
Support NAWQA Cycle 3.....	+1,881	Fixed Costs.....	+1,223
Unconventional Oil and Gas Research.....	+450		
Fixed Costs.....	+499	Subtotals for Changes Across Multiple Subactivities	
		Fixed Costs.....	[+4,729]