Program Changes

Dollars in Thousands	2016 Enacted	2017 CR	2018 Program Changes	Fixed Costs	2018 Request
Ecosystems	**$160,232**	**$159,927**	**-$29,547**	**$1,748**	**$132,128**
Status and Trends Program	$20,473	$20,434	-$3,806	$206	$16,834
Fisheries Program	$20,886	$20,846	-$5,253	$253	$15,846
Wildlife Program	$45,757	$45,670	-$10,707	$508	$35,471
Environments Program	$38,415	$38,342	-$9,392	$392	$29,342
Invasive Species Program	$17,330	$17,297	-$127	$127	$17,297
Cooperative Research Units Program	$17,371	$17,338	-$262	$262	$17,338
Land Resources	**$139,975**	**$139,709**	**-$25,987**	**$602**	**$112,847**
National Land Imaging Program	$72,194	$72,057	$3,730	$340	$76,127
Land Change Science Program	$10,492	$10,472	-$20,627	$122	$19,285
National and Regional Climate Adaptation Science Centers	$26,435	$26,385	-$9,090	$140	$17,435
Climate Research and Development Program	$21,495	$21,454	$0	$0	$0
Carbon Sequestration Program	$9,359	$9,341	$0	$0	$0
Energy and Mineral Resources, and Environmental Health	**$94,511**	**$94,331**	**-$5,519**	**$1,221**	**$91,510**
Energy and Mineral Resources	$73,066	$72,927	-$934	$934	$74,404
Mineral Resources Program	$48,371	$48,279	-$644	$644	$48,279
Energy Resources Program	$24,695	$24,648	-$290	$290	$26,125
Environmental Health	$21,445	$21,404	-$4,585	$287	$17,106
Contaminant Biology Program	$10,197	$10,178	-$2,087	$139	$8,230
Toxic Substances Hydrology Program	$11,248	$11,226	-$2,498	$148	$8,876
Natural Hazards	**$139,013**	**$138,748**	**-$22,116**	**$1,479**	**$118,111**
Earthquake Hazards Program	$60,503	$60,388	-$9,561	$561	$51,388
Volcano Hazards Program	$26,121	$26,071	-$3,982	$343	$22,432
Landslide Hazards Program	$3,538	$3,531	-$53	$53	$3,531
Global Seismographic Network	$6,453	$6,441	-$1,484	$29	$4,986
Geomagnetism Program	$1,888	$1,884	-$1,884	$0	$0
Coastal/Marine Hazards and Resources Program	$40,510	$40,433	-$5,152	$493	$35,774

Dollars in Thousands	2016 Enacted	2017 CR	2018 Program Changes	Fixed Costs	2018 Request
Water Resources	**$210,687**	**$210,287**	**-$39,906**	**$2,661**	**$173,042**
Water Availability and Use Science Program	$42,052	$41,972	-$12,201	$642	$30,413
Groundwater and Streamflow Information Program	$71,535	$71,399	-$3,982	$742	$68,159
National Water Quality Program	$90,600	$90,428	-$17,235	$1,277	$74,470
Water Resources Research Act Program	$6,500	$6,488	-$6,488	$0	$0
Core Science Systems	**$111,550**	**$111,339**	**-$19,391**	**$1,021**	**$92,969**
National Geospatial Program	$62,854	$62,735	-$11,375	$575	$51,935
National Cooperative Geologic Mapping Program	$24,397	$24,351	-$2,314	$244	$22,281
Science Synthesis, Analysis and Research Program	$24,299	$24,253	-$5,702	$202	$18,753
Science Support	**$105,611**	**$105,410**	**-$17,124**	**$1,082**	**$89,368**
Administration and Management	$81,981	$81,825	-$13,390	$944	$69,379
Information Services	$23,630	$23,585	-$3,734	$138	$19,989
Facilities	**$100,421**	**$100,230**	**$0**	**$11,963**	**$112,193**
Rental Payments and Operations & Maintenance	$93,141	$92,964	$0	$11,963	$104,927
Deferred Maintenance and Capital Improvement	$7,280	$7,266	$0	$0	$7,266
USGS Total	**$1,062,000**	**$1,059,981**	**-$159,590**	**$21,777**	**$922,168**

The 2018 President's budget includes $922.2 million for the USGS, a program decrease of $159.6 million over the 2017 Annualized Continuing Resolution and fixed costs of $21.8 million. The 2018 budget request proposes various reductions in programs, but reflects a commitment to executing core USGS mission responsibilities. The USGS focus continues to be providing impartial scientific data and leading-edge research that supports policies and decisions that promote the health, safety, and prosperity of the Nation. With this proposed requested budget, the USGS is reducing or eliminating programs.

More information on the program changes proposed in 2018 can be found in the Mission Area Chapters.

Ecosystems

Status and Trends Program **(-$3,806,000/-24 FTE)**

Eliminate Curation of Smithsonian Museum Collections (-$1,600,000/-11 FTE): This reduction eliminates active curation of mammal and bird collections housed at the Smithsonian Institution and the research associated with the collection. It would also eliminate USGS research on systematics of North American species important to Interior for management of trust responsibilities and development of modern museum methods, including three-dimensional imaging and DNA cataloging to preserve specimens and facilitate rapid electronic sharing of species information.

Reduce Species-Specific Wildlife Research (-$2,000,000/-13 FTE): This reduces the science that supports Interior and other Federal, State, and tribal agencies' management of species under their authority, such as manatees, grizzly bears, walruses, polar bears, and migratory birds. This decreases support to States for management of game, fish, furbearer species, and waterfowl that provide recreational fishing and hunting opportunities.

Reduce Status and Trends Program Operations (-$206,000/0 FTE): This reduces the support of field research to understand the current condition (status) and changes to that condition (trends) for species under management responsibility of Interior bureaus and other Federal, State, and tribal partners, including equipment, services, and work with partners.

Fisheries Program **(-$5,253,000/-34 FTE)**

Eliminate Unconventional Oil and Gas Research (-$1,000,000/-7 FTE): This eliminates research on ecological effects of unconventional oil and gas development in the Marcellus (Pennsylvania) and Bakken (North Dakota) shales. This would decrease information for Federal and State resource management agencies that guides natural gas development in ways that avoid or minimize impacts to valued fish and wildlife habitat. The USGS would also discontinue development of genetic (specific genes) and genomic (all of an organism's genes) indicators of environmental stress that can be used by resource managers, public health agencies, and other responders to detect and respond to leaks and reduce risks to fish, wildlife, and humans.

Reduce Contaminants Research (-$500,000/-4 FTE): This decreases the number of studies the USGS will conduct on the sources and impacts of contaminants that may affect commercial and sport fish, forage fish, and Federal species of management concern. This would also discontinue the development of genetic and genomic tools to study impacts of endocrine disruptors on sport fish populations such as small mouth bass.

Reduce Species-Specific Fisheries Research (-$3,500,000/-23 FTE): This reduces the science that supports Interior and other Federal, State, and tribal agencies' management of species under their authority, such as salmon, trout, sturgeon, shad, and migratory fish. This decreases support to states for management of sports fisheries that provide recreational opportunities to anglers. This decrease would also eliminate the Fisheries portion of the USGS Science Support Program, which funds approximately 30 projects per year with the Fish and Wildlife Service (FWS) to address research needs for fisheries management.

Reduce Fisheries Program Operations (-$253,000/0 FTE): This reduces the support to protect and enhance the Nation's fisheries and aquatic resources, with particular focus on Interior trust responsibilities for protected species, migratory species, and species managed through tribal and other international treaties, including equipment, services, and work with partners.

Wildlife Program **(-$10,707,000 /-63 FTE)**

Eliminate Whooping Crane Propagation Program (-$1,500,000/-5 FTE): This eliminates the largest dedicated captive breeding effort for Endangered Species Act-listed cranes and eliminates capacity within Interior for avian studies that require controlled studies with large, rare birds. The program, while providing valuable contributions to whooping crane recovery, is no longer required to meet species recovery goals.

Reduce Contaminants Research (-$500,000/-3 FTE): This decreases the number of studies the USGS conducts on the sources and impacts of contaminants that may affect wildlife and other terrestrial organisms. This would also discontinue endocrine disruptor research on migratory birds, raptors, and amphibians.

Reduce Changing Arctic Ecosystems Research and Monitoring (-$1,600,000/-11 FTE): This reduces science support for management and policy decisions, including those related to trust responsibilities defined by the Marine Mammal Protection Act. It reduces science to support adaptation of management by the FWS, the National park Service (NPS), and the Bureau of Land Management (BLM) in northern Alaska, which affects Native communities. It also reduces the availability of information related to transmission of avian influenza by migratory waterfowl passing through Alaska that could infect other wildlife or poultry in the contiguous United States.

Reduce Species-Specific Wildlife Research (-$6,599,000/-44 FTE): This reduces the science that supports Interior and other Federal, State, and tribal agencies' management of species under their authority, including marine mammals, ungulates, migratory and songbirds, and amphibians. It decreases support to states for management of game and waterfowl species that provide recreational opportunities to hunters. This decrease would also eliminate the USGS Natural Resource Preservation Program, which funds approximately 40 projects per year with the NPS to address research needs for wildlife management in National Parks.

Reduce Wildlife Program Operations (-$508,000/0 FTE): This reduces science, technology, and decision support to inform management of migratory birds, terrestrial and marine mammals, amphibians and reptiles, and terrestrial plants, with particular focus on Interior trust responsibilities, including equipment, services, and work with partners.

Environments Program **(-$9,392,000 /-59 FTE)**

Reduce Ecosystem Services Tool Development and Case Studies (-$1,000,000/-6 FTE): This reduces the development of tools and case studies within the national framework for ecosystem services, including delaying development of decision support systems for Interior bureaus and other Federal agencies.

Reduce Greater Everglades Research and Monitoring (-$5,000,000/-33 FTE): This discontinues research and monitoring on effects of altered water flow on the ecology of the Greater Everglades. This will limit the scientific information available to the NPS, FWS, U.S. Army Corps of Engineers, and the State of Florida to help inform investments for management and restoration.

Reduce Chesapeake Bay Research and Monitoring (-$3,000,000/-20 FTE): This decreases the amount of scientific information used by six States and multiple Federal agencies to develop effective management plans to reduce impacts of nutrients, sediment, and contaminants and improve habitat for waterfowl, fish, and shellfish.

Reduce Environments Program Operations (-$392,000/0 FTE): This reduces the science to understand natural and human influences on the ecosystems, lands, and waters under management responsibility of Interior bureaus and other Federal, State, and tribal partners, including equipment, services, and work with partners.

Invasive Species Program **(-$127,000 /0 FTE)**

Reduce Invasive Species Program Operations (-$127,000/0 FTE): This reduces the development of tools, technologies, and decision support systems to detect, monitor, assess risk, and control aquatic and terrestrial invasive species, including invasive wildlife diseases. In addition, equipment, services and work with partners will be impacted.

Cooperative Research Units Program **(-$262,000 /0 FTE)**

Reduce Cooperative Research Units Program Operations (-$262,000/0 FTE): This reduces ability to provide a cost-effective, national network of Federal, State, and university partnerships per the Cooperative Research Units Act of 1960, with a legislated mission of research, education, and technical assistance focused on fish, wildlife, ecology, and natural resources. In addition, equipment, services and work with partners will be impacted.

Land Resources

National Land Imaging Program **(+3,730,000/-52 FTE)**

Landsat 9 Ground System Development (+$22,400,000/0 FTE): This increase provides the additional funding required for the continued development of the Landsat 9 ground system and supports the launch date goal of fiscal year 2021. The funding would cover the following USGS activities: perform final design activities for the Mission Operations Center (MOC), Ground Network Element (GNE), and Data Processing and Archive System (DPAS), hold critical design reviews for each element, develop first releases, support NASA Spacecraft final design and initial development, and conduct other activities necessary to ensure that all ground system requirements for the Landsat 9 mission are met in accordance with science mission design criteria.

Eliminate Support for the National Civil Applications Center (-$4,847,000/-31 FTE): This eliminates direct finding for the National Civil Applications Center and associated USGS research, monitoring, and data collection activities using classified remote sensing imagery, as well as its acquisition of imagery on behalf of other civil agencies. Both of the USGS secure compartmentalized information facilities (Reston, VA and Denver, CO) will be closed.

Reduce Satellite Operations (-$8,996,000/-4 FTE): This reduction defers noncritical system maintenance and hardware and software refresh within archive operations, and distribution of satellite data other than Landsat. This reduction would also reduce support for requirements and capabilities analysis for a land observation satellite that may follow Landsat 9.

Eliminate AmericaView State Grant program (-$1,215,000/0 FTE): This reduction eliminates State grants that support the use of Landsat and other public domain remote sensing satellite data through applied remote sensing research, K-12 and higher STEM education, workforce development and technology transfer.

Reduce Science, Research and Investigations (-$3,272,000/-17 FTE): This reduction would impact Landsat based research across the United States, ending essentially all USGS remote sensing research being conducted in a variety of application areas, including water resource monitoring, Chesapeake Bay water quality, Rocky Mountain landslides permafrost studies and mapping of U.S. vegetation dynamics. The reduction would also delay the availability of the Land Change Monitoring, Assessment, and Projection (LCMAP) designed to provide the foundation for Federal land change monitoring activities, allowing time series modeling power of the Landsat data record going back to 1972. This reduction would slow the development of new information product development and map products that would affect land managers work associated with water resources, wildfire impacts, and our understanding of snow covered areas across the Country.

Reduce National Land Imaging Operations (-$340,000/0 FTE): This reduction diminishes the NLI's ability to execute its core activities including collecting, processing and providing the Nation with digital land surface images. These images provide critical information needed for natural resource and infrastructure monitoring and management, including forest health, wildfire recovery, effects of drought on water supply, flood and other disaster recovery, agricultural production and energy exploration and extraction, including equipment, services, and work with partners.

Land Change Science Program **(-20,627,000/ -88 FTE)**

Eliminate Biologic Carbon Sequestration (-$5,237,000/-17 FTE): This eliminates projects to develop methods for the inventory and tracking of carbon stored in ecosystems in the United States, understand processes that control carbon sequestration and release in different ecosystems, design strategies to enhance carbon stored in National Wildlife Refuge ecosystems, model carbon flux in ecosystems, and create a standard methodology for the inventory of biological carbon sequestration for the entire United States.

Reduce Geologic Carbon Sequestration: (-$2,627,000/-13 FTE): This greatly curtails work to monitor and evaluate induced seismicity associated with geologic CO_2 storage, evaluate the geochemistry of produced groundwater and the potential for CO_2 leakage from the injection zones, develop economic models for CO_2 storage in saline formations and associated with enhanced oil recovery operations. In addition, the budget constrains collaborative work with the Bureau of Land Management (BLM) and the State geological surveys under The Helium Stewardship Act of 2013, to assess the availability of recoverable natural helium and associated CO_2 found in natural gas reservoirs in the United States.

Eliminate Landscape Science Projects (–$1,498,000/-4 FTE): This eliminates projects to develop methodologies for incorporating remote sensing products in landscape analyses, including land change effects on water quality in the Chesapeake Bay, wildlife habitat in the Rocky Mountains, and Pacific coastal fogs related to water availability for restoration. This reduction also eliminates support for carbon biogeochemical cycling and analyses of forest management practices effects on wildfires and biodiversity.

Eliminate Climate Research and Development Activities (-$11,143,000/-54 FTE): This eliminates investigations of changes in land cover and interactions between land use, land change and regional climate, research to identify processes related to carbon in soils, studies of arid vegetation response to extended drought, investigations of hydrologic and biogeochemical change in Prairie Pothole wetlands, and investigations of heat exchange beneath polar ice sheets. The reduction also eliminates production of datasets of land management practices and the effects of climate fluctuations on recreational uses of wetlands and other lands characterized by organic soils and paleoclimate datasets that support modeling of wildlife and fisheries changes and the capacity to understand how and why landscapes change over time.

Reduce Land Change Science Operations (-$122,000/0 FTE): This reduction diminishes the LCSP's ability to execute its core activities the development of information and tools identifying possible solutions to the environmental, natural resource, and economic challenges required to promote resilient communities and the sustainable use of the Nation's resources, including equipment, services, and work with partners.

National and Regional Climate Adaptation Science Centers (-9,090,000/ -24 FTE)

Eliminate Support for the National Phenology Network (-$250,000/-2 FTE): This eliminates work on a 10-year retrospective report linking changes in climate to changes in timing of natural events, such as bird nesting, blooming of flowers and hatching of fish eggs. The report would have enhanced our understanding of the timing of events in plant and animal life cycles and how that timing can affect people and ecosystems. This type of information provides insight on the best times to hunt and fish, when to plant and harvest crops, and when to navigate waterways.

Eliminate Support for the GeoData Portal at the Office of Water Infrastructure (-$200,000/-2 FTE): The eliminates the program's support for maintenance and new development and the addition

of new datasets in the GeoData Portal, as well as data management of large climate and land use/land cover model output. Terminating this support would make it harder to access and use data that feed into planning and decision support tools used for climate adaptation strategies that help minimize the economic and other risks of changes to watersheds, lands, and wildlife.

Realign the National and Regional Climate Adaptation Science Centers (-$8,500,000/-20 FTE): This reduction would eliminate four (of eight) regional CASCs, refocusing work on the highest priority needs of Interior bureaus and States, supporting their development and adaptation of fish and wildlife management plans, and natural resource adaptation science needs. The realigned CASCs will continue cover science across the Nation; however, project capacity will need to adjust to the realigned number of centers, potentially reducing activities by approximately 50 percent.

Reduce National and Regional Climate Adaptation Science Centers Operations (NRCASCs) (-$140,000/0 FTE): This reduction diminishes the NRCASCs ability to execute its core activities including developing tools and information needed by fish and wildlife managers to develop and execute management strategies to better adapt to changes in natural resources and to minimize economic and other risks, including equipment, services, and work with partners.

Energy and Mineral Resources

Mineral Resources Program **(-$644,000/ 0 FTE)**

Reduce Mineral Resources Program Operations (-$644,000/0 FTE): This reduces the MRP's ability to execute its core activities, such as conducting assessments of mineral resources across the Nation and research on mineral potential, production, and consumption, including equipment, services, and work with partners.

Energy Resources Program **(-$290,000/ 0 FTE)**

Reduce Energy Resources Program Operations (-$290,000/0 FTE): This reduces the ERP's ability to execute its core activities, including conducting energy resource assessments and research on geologic energy resources such as: oil, natural gas, coal, coalbed methane, gas hydrates, geothermal resources, uranium, oil shale, bitumen, and heavy oil, and includes equipment, services, and work with partners.

Environmental Health

Contaminant Biology Program **(-$2,087,000/-16 FTE)**

Reduce Contaminant Research (-$1,948,000/-16 FTE): This reduction decreases scientific information, such as sampling and analysis used to determine actual rather than perceived health risks

of legacy and emerging contaminants to humans, fish, and wildlife. This loss of information would impact specific regions of the Nation (e.g., the Chesapeake Bay watershed and the Great Lakes) as well as lands managed for recreational hunting and fishing, tribal subsistence, or other recreational purposes. The reduction also decreases the transferability of this information across the Nation, reducing the availability of comparative science to analyze similar circumstances of contaminant occurrence in other areas across the United States and inform policies and practices.

Reduce Contaminant Biology Program Operations (-$139,000/0 FTE): This reduces the CBP's ability to execute its core activities, including conducting science regarding exposures to toxicological and infectious disease agents in the environment that is needed to make decisions of critical importance to the Nation, such as decisions related to resource development, disaster response, and infrastructure, and including equipment, services, and work with partners.

Toxic Substances Hydrology Program **(-$2,498,000/-15 FTE)**

Eliminate Radioactive Waste Disposal Science in Support of Energy and Land and Water Stewardship (-$700,000/-5 FTE): This eliminates a project that informs decision makers, land managers, and landowners about the safe disposal of low-level radioactive waste on both private and public lands in arid environments, by showing the likelihood of radioactivity moving offsite, how far it may move, and how long it takes to get there.

Eliminate Municipal Wastewater Science to Support Land and Water Stewardship and Infrastructure (-$100,000/-1 FTE): This eliminates a project providing science to help manage the safe disposal of wastewater in municipalities across the Nation and in areas such as coasts and National Parks. This non-regulatory science is used by States, municipalities, wastewater treatment facilities, and other stakeholders to understand the health implications of pathogens, nutrients, and chemicals in water bodies affected by municipal wastewaters and sewage. This will result in the loss of information available to decision makers about wastewater infrastructure in areas where water is reused, or where discharges and leakages occur from wastewater treatment facilities. Remaining funds will be used to close existing research sites.

Eliminate Contaminant Science in Support of Water and Land Stewardship, Energy, and Wastewater and Drinking Water Infrastructure (-$1,550,000/-9 FTE): This reduction would mean a loss of specialized expertise needed by both ongoing and new USGS studies that provide non-regulatory, non-advocacy science to understand and address health hazards posed by environmental contaminants in tap waters, recreational waters, and fisheries (for example, harmful algal toxins, lead, arsenic, perfluorinated compounds, and other contaminants of emerging concern). Such information is utilized by policymakers at all levels, the private sector, and other stakeholders to understand actual versus perceived risks to health posed by environmental contaminants, and to develop appropriate, cost-effective, and technologically feasible policies and strategies to reduce exposures to environmental contaminants.

Reduce Toxic Substances Hydrology Program Operations (-$148,000/0 FTE): This reduces the TSHP's ability to execute its core activities, including conducting science regarding exposures to toxicological and infectious disease agents in the environment that is needed to make decisions of critical importance to the Nation, such as decisions related to resource development, disaster response, and infrastructure, and including equipment, services, and work with partners.

Natural Hazards

Earthquake Hazards Program **(-9,561,000 /-12 FTE)**

Eliminate Implementation of Earthquake Early Warning System for the West Coast (-$8,200,000/-10 FTE): This elimination would end USGS efforts to implement the *ShakeAlert* earthquake early warning system, suspending internal efforts and eliminating external funding to partners (California Institute of Technology, Central Washington University, University of California at Berkeley, University of Nevada at Reno, University of Oregon, and the University of Washington).

Reduce Support for Regional Earthquake Monitoring, Assessments and Research (-$800,000/-2 FTE): This reduces support for regional earthquake monitoring, hazard assessment, and research in areas of moderate seismic risk, specifically Alaska and the Central and Eastern United States. This would also reduce grants supporting targeted research by academic, State, and private sector partners, which may slow the rate of updates to seismic provisions in building codes and provide less science to support risk mitigation actions. The USGS would also suspend its annual forecast of hazard related to both natural and induced seismicity.

Reduce Earthquake Hazards Operations (-$561,000/0 FTE): This reduction would diminish the EHP's ability to execute its core activities including monitoring and reporting on earthquakes, assessing earthquake hazards, as well as delivery of earthquake products to emergency responders, including equipment, services, and work with partners.

Volcano Hazards Program **(-3,982,000 /-7 FTE)**

Suspend Implementation of NVEWS (-$1,500,000/-2 FTE): This suspends implementation of the National Volcano Early Warning System, including installations to close monitoring gaps on Very-High-Threat volcanoes in the contiguous United States and upgrade analog monitoring stations in Alaska to comply with National Telecommunications and Information Administration spectrum allocation restrictions, and developing a next generation lahar detection system for Mt. Rainier, Washington.

Reduce Volcano Hazard Assessments (-$1,639,000/-3 FTE): This reduces the pace of hazard assessments at High- and Very-High-Threat volcanoes. The reduction would also reduce efforts to develop volcano hazard assessments used to inform monitoring and decisions on managing risks from

eruptions, narrowing the focus of assessments to understanding volcanic systems and technologies for future monitoring and widespread instrument deployment.

Suspend Maintenance of Monitoring Networks and Data Analysis at Yellowstone and Commonwealth of the Northern Mariana Islands (-$500,000/-2 FTE): This suspends maintenance of USGS monitoring networks which will diminish monitoring of the Yellowstone volcanic region, including real-time temperature monitoring of stream and hydrothermal pools, resulting in significantly reduced awareness of changes within a large caldera system where ground deformation and hydrothermal explosions are commonplace. This reduction would also suspend maintenance of monitoring networks on three active volcanoes in the Commonwealth of the Northern Mariana Islands.

Reduce Volcano Hazards Operations (-$343,000/0 FTE): This reduction would diminish the VHP's ability to execute its core activities to provide forecasts and warnings of hazardous volcanic activity at volcanoes in the United States with the current monitoring networks; to provide forecasts and warnings and situational awareness of hazardous volcanic activity; and to produce updated volcanic hazard assessments, including equipment, services, and work with partners.

Landslide Hazards Program **($-53,000/0 FTE)**

Reduce Landslide Hazards Operations (-$53,000/0 FTE): This reduction would diminish the LHP's ability to execute its core activities for landslide loss reduction including: providing debris-flow hazard assessments and early warning for areas recently burned by wildfire; supporting expansion of landslide alerts to selected non-burned areas; maintaining capability to respond to major landslide crises; and continuing to develop and improve methods for landslide hazard assessment and situational awareness, including equipment, services, and work with partners.

Global Seismographic Network **(-$1,484,000/-2 FTE)**

Suspend implementation of GSN seismic station upgrades (-$1,455,000/-2 FTE): This reduction would suspend the deployment of 15 to 20 sensors procured by the Department of Energy, National Nuclear Security Administration to improve the GSN infrastructure by replacing aged and degraded sensors.

Reduce Global Seismographic Network Operations (-$29,000/0 FTE): This reduction would diminish the GSN's ability to execute its core activities including operating the existing network to provide seismic data needed for earthquake alerts and situational awareness products, tsunami warnings, national security, hazard assessments and research, including equipment, services, and work with partners.

Geomagnetism Program **(-$1,884,000/-15 FTE)**

Eliminate the Geomagnetism Program (-$1,884,000/-15 FTE): This eliminates the Geomagnetism Program, an element of the U.S. National Space Weather Program. This will reduce the accuracy of NOAA and U.S. Air Force forecasting of the magnitude and impact of geomagnetic storms. In addition to eliminating the data provided to partner Federal agencies, the elimination of the program will also reduce the availability of geomagnetic information to the oil drilling services industry, geophysical surveying industry, several international agencies, and electrical transmission utilities.

Coastal/Marine Hazards and Resources Program **(-$5,152,000/-16 FTE)**

Eliminate Marine Habitat/Resource Mapping and Ocean and Glacier Studies to Inform Resource Management (-$1,600,000/-6 FTE): This reduction would eliminate monitoring, research, and model development to forecast the impacts on coastal waters, ecosystems and fisheries due to ocean acidification and changing fluxes of nutrients, freshwater, and sediment from retreating glaciers. This will reduce the information and tools available to resource managers to anticipate and respond to stresses on commercial, recreational, and subsistence fisheries in the Gulf of Mexico and Gulf of Alaska. Additionally, it reduces application of USGS mapping expertise to characterize marine habitats and sand resources required for beach nourishment in areas where operational costs are not provided by external partners.

Eliminate Elevation Model Development and Regional Coastal Resource Assessments (-$2,500,000/-7 FTE): This reduces the development of "user ready" regional onshore/offshore elevation models for regional restoration of San Francisco Bay, the Pacific Northwest, the Northern Gulf of Mexico and Florida. These models are also used for State and Federal coastal management and planning. It also reduces development and delivery of large-scale assessments of coral reef and associated community vulnerability including impacts of changing reef structure on tourism, recreational and commercial fisheries, and hazard exposure of military and other infrastructure in Florida, Hawaii, and the Pacific and Caribbean territories.

Reduce Support for Regional Coastal Management, Restoration, and Risk Reduction (-$559,000/-3 FTE): This would result in a reduction of activities in the Gulf of Mexico, Pacific and Atlantic regions resulting in fewer and delayed products to support planning and implementation of regional coastal management, restoration, and risk reduction strategies by Interior, other Federal and State agencies. For example, activities in the Fire Island National Seashore, New York, to inform State and Federal management and planning to reduce coastal hazards and manage protected resources and studies supporting the Puget Sound Partnership goals for regional restoration will be concluded. Regional studies supporting restoration in the Northern Gulf of Mexico and San Francisco Bay will be reduced, decreasing the scope and extending the timeline for delivery of products to inform regional restoration efforts locally and in similar coastal settings nationwide.

Reduce Coastal/Marine Hazards and Resources Operations (-$493,000/0 FTE): This reduction would diminish the CMHRP's ability to execute its core activities, including addressing coastal and marine issues of national consequence that have the greatest potential to impact public safety as well

as coastal and marine policy, planning, and management, including equipment, services, and work with partners.

Water Resources

Water Availability and Use Science Program (WAUSP) (-$12,201,000/-60 FTE)

Reduce National Research Program (-$4,325,000/-28 FTE): This reduces research in the San Francisco Bay Delta, Klamath Lake, the Florida Everglades, and Chesapeake Bay to improve operational forecasting of water availability and ecological health. In addition, geomorphic and sediment research will be eliminated. This also reduces research at the 32 USGS Water Science Centers across the United States that address existing and emerging water availability and use issues. This reduces localized, regional, and national studies examining how changes in water budget components (including precipitation, evapotranspiration, streamflow, and groundwater) impact water availability. The ability to extrapolate current conditions, both spatially and temporally, and forecast future changes using surface and groundwater models would be reduced, limiting information for resource managers.

Eliminate Water Use Data and Research (-$1,500,000/-1 FTE): This eliminates cooperative agreements with States to improve the availability, quality, compatibility, and delivery of water-use data that is collected or estimated by States in order to manage long-term water supplies.

Eliminate Mississippi Alluvial Plan Aquifer Assessment Project (-$1,000,000/-7 FTE): This would eliminate the Mississippi Alluvial Plan Aquifer Assessment, including the collection of detailed information about the interaction of groundwater and streamflow that would support sustainable agriculture in Mississippi, Louisiana, Arkansas, Alabama and Tennessee.

Eliminate U.S.-Mexico Transboundary Aquifer Assessment Project (-$1,000,000/-4 FTE): This eliminates the U.S.-Mexico Transboundary Aquifer Assessment, a collaboration with the USGS, the States of Arizona, New Mexico, and Texas through their Water Resources Research Institutes and the International Boundary and Water Commission, stakeholders, and Mexican counterparts to provide new information and a scientific foundation for State and local officials to address water-resource challenges along the U.S. – Mexico border.

Eliminate Water-Use Unconventional Oil and Gas (-$250,000/-1 FTE): This eliminates a pilot study in the Williston Basin (Western Dakotas and eastern Montana) to provide tools and information to determine the quantities of water necessary to develop and recover unconventional oil and gas resources.

Eliminate Focus Area Studies (-$1,600,000/-8 FTE): This eliminates collaborative studies in the Upper Rio Grande, the Red River, and the Coastal Carolina Basins with State and local partners to provide data, models and decision-support tools, such as water availability estimates, snow melt information, and groundwater and surface water models to improve water resource management.

Eliminate Two Regional Groundwater Evaluations (-$789,000/-4 FTE): This eliminates two of 14 studies of regional groundwater, the Coastal Lowlands Aquifer System (CLAS), which extends from Texas to the Panhandle of Florida, and the California Coastal Basin Aquifers. The CLAS study focuses on land subsidence issues in Houston and developing tools to assist in managing the entire groundwater system from Texas to northern Florida. The California Coastal Basins study applies new modeling techniques to enable local agencies to identify groundwater issues, such as chronic lowering of groundwater levels, reduction of storage, seawater intrusion, degraded water quality, land subsidence, and depletion of interconnected surface waters.

Eliminate Groundwater Model Development, Maintenance and Sustainability (-$1,095,000/-7 FTE): This eliminates maintenance and improvements on existing groundwater software tools, MODFLOW and GSFLOW. MODFLOW is the de facto international standard code for aquifer simulation and GSFLOW is a linked surface water and groundwater modeling code. Both tools provide valuable information used in resource management.

Reduce Water Availability and Use Science Program Operations (-$642,000/0 FTE): This reduction would diminish the ability to execute its core activities including assessing and quantifying the availability of groundwater resources, providing a more accurate assessment of the status and trends of the water resources of the United States, as well as developing the basis for an improved ability to forecast the availability of water for future economic, energy production, and environmental uses. In addition, equipment, services and work with partners will be impacted.

Groundwater and Streamflow Information Program (GSWIP) (-$3,982,000/-10 FTE)

Reduce National Research Program (NRP) (-$1,540,000/-10 FTE): This reduces research on water quality and the development of effective remediation strategies, which may extend hazardous waste cleanup in many States by several years. It will also end the collection and provision of water-quality data and trend analysis on nutrients and sediments to Federal and State partners in the Gulf of Mexico and Chesapeake Bay, as well as affect local and State efforts to lower nutrient levels affecting drinking water intakes and local rivers and lakes.

Reduce National Groundwater Monitoring Network (NGWMN) (-$1,700,000/0 FTE): This reduces cooperative agreements with States that support national and local groundwater databases that are shared through the NGWMN Data Portal. In addition, it will reduce support for a network of groundwater wells that monitor the effects of droughts and other factors on groundwater levels. The network consists of about 130 groundwater wells in 20 states. This may increase difficulties for States, regional authorities, and local agencies coordinating management activities related to drought, water resource planning and permitting on shared groundwater resources. It also reduces well maintenance and replacement, creating information gaps.

Reduce Groundwater and Streamflow Information Program Operations (- $742,000/0 FTE): This reduction would diminish the ability to execute its core activities including strengthening the National streamgage and groundwater monitoring networks, developing and implementing hazard

data collection, information presentation and new tools to minimize loss of life and property, research, development, as well as application of cost-effective monitoring, record maintenance, and data delivery. In addition, equipment, services and work with partners will be impacted.

National Water Quality Program (NWQP) (-$17,235,000/-108 FTE)

Reduce National Research Program (NRP) (-$6,011,000/-40 FTE): This would suspend studies in Arizona, California, Colorado, and Minnesota that focus on how contaminants move through the environment, their degradation or, if they persist, whether or not they pose a risk to human or aquatic ecosystem health. It would suspend studies that examine how nutrients, carbon and sediment are transported and delivered to small streams in the agricultural Midwest and to large estuaries such as the Chesapeake Bay or in the Gulf of Mexico. Studies examining the post-wildfire impacts on water quality and ecosystems in the Western United States and the effects of climate variability on the condition of permafrost in Alaska would also be suspended. The ability to forecast which legacy or emerging contaminants pose a threat to drinking water supplies in Arizona and Colorado or the health of aquatic ecosystems in California, the upper Midwest, and the Gulf of Mexico would be sharply curtailed. The ability to extrapolate current conditions and forecast future changes in water quality in important watersheds, such as the Mississippi River Basin or critical aquifers like the Central Valley of California, would be delayed 5-10 years, suspending the production of critical information water resource managers use to evaluate water resources for agricultural irrigation and safe drinking water supplies across the United States.

Eliminate National Park Service Cooperative Water Partnership (NPS-CWP) (-$1,743,000/-12 FTE): This funding decrease would eliminate the NWQP's NPS-CWP, which provides water-quality science support to the National Park Service. For over 20 years, the NPS-CWP has supported data collection and interpretative studies of priority water-quality issues in the Nation's national parks including the occurrence of emerging contaminants, harmful algal blooms, endocrine disrupting compounds, harmful algal blooms, and mercury and other metals in park waters. Collectively or individually, these sources of water-quality impairment threaten human and aquatic ecosystem health and have the potential to decrease the number of visitors and reduce revenue in affected parks. Twenty-one existing projects will be stopped that include studies examining threats to water quality in Crater Lake National Park (OR), Golden Gate National Recreational Area and Yosemite National Park (CA), Chattahoochee National Recreational Area (GA), Voyagers National Park (MN), Fire Island National Seashore (NY), Saguaro National Park (AZ), Lake Mead (AZ, NV) Delaware River Gap (NJ, PA), Jamestown Island Colonial National Historic Park (VA), and New River Gorge (WV). Without these projects, and any future planned projects, the NPS will have less information with which to make decisions about water quality, which would impact the public water supply at the parks and potentially affect the health of park visitors and wildlife.

Eliminate National Atmospheric Deposition Program (NADP) (-$1,576,000/-10 FTE): This decrease will eliminate USGS participation in the NADP a collaborative effort that involves about 250 Federal, State, tribal, academic, and local organizations who operate five national monitoring networks that measure atmospheric inputs of nutrients, acidic compounds, mercury, ammonia, and other chemicals to aquatic and terrestrial ecosystems. The decrease would eliminate monitoring at 82

sites in 38 States and Puerto Rico, which is about 30 percent of the program's network. NADP data, which go back 40 years at some sites, are used to produce the Environmental Protection Agency and the International Joint Commission air quality reports, to establish mercury fish consumption advisories and provide surveillance data for biological, chemical, or radiological agents derived from natural or manmade disasters, such as radioactive fallout from the 2011 Fukushima reactor meltdown.

Reduce National Water-Quality Assessment Project Lower Mississippi Stream Quality Assessment (-$4,000,000/-28 FTE): This eliminates the planned NAWQA Project stream-quality assessment study of the Lower Mississippi River Basin (LMRB). The collaborative study would have characterized sources of water-quality and aquatic ecosystem impairment—contaminants, nutrients, sediment, and streamflow— and ecological conditions in streams in Arkansas, Louisiana, Mississippi, Missouri, Tennessee and Kentucky to determine the relative effects of these stressors on the health of aquatic communities and to identify which human and natural factors are most critical in controlling stream quality.

Reduce National Water-Quality Assessment Project Trends Assessments (-$2,628,000/-18 FTE): This decrease will delay implementation of planned studies that will determine and explain which natural and human factors are most important in influencing long-term trends in surface water and groundwater quality. The decrease also eliminates planned sampling of groundwater-quality networks in seven States (AZ, IL, MN, NJ, SC, TX, and WA), and eliminates water-quality sampling at four percent of the long-term monitoring sites operated as part of the USGS National Water Quality Network for Streams and Rivers. This decrease would also delay or suspend a study of long-term water quality trends in the Nation's rivers and streams. The decrease will delay data analysis and reporting by four years and delay work at the regional and national scale to assess the effectiveness of investments in wastewater treatment plant upgrades and best management practices, particularly in agricultural areas.

Reduce National Water Quality Program Operations (-$1,277,000/0 FTE): This decrease would reduce NAWQA Project activities assessing the current and future quality of the Nation's freshwater resources, evaluating which human and natural factors are driving observed geographic patterns and trends, and developing tools and models water resource managers and drinking-water suppliers can use to forecast short and long-term changes to water quality, such as forecasting harmful algal blooms or decadal-scale changes in groundwater quality. In addition, maintenance of monitoring equipment, data services and work with partners will be impacted.

Water Resources Research Act (WRRA) (-$6,488,000/-1 FTE)

Eliminate Water Resources Research Act Program (-$6,488,000/-1 FTE): This eliminates a grant and cooperative agreement program for land grant universities. This would end USGS involvement in coordination and administrative support for all grants to Water Resource Research Institutes. Applied research projects that address a wide variety of water resource topics and problems at the State level would no longer receive funding through this expired program.

Core Science Systems

National Geospatial Program **(-11,375,000/-26 FTE)**

Reduce Federal Geographic Data Committee Functions (-$2,700,000/-7 FTE): This eliminates Interior sponsorship of several Federal Geographic Data Committee (FGDC) committees and projects, but retains core FGDC committee support, stakeholder engagement, and strategic planning support. Reductions and eliminations include activities supporting the Federal Geospatial Platform; the National Geospatial Advisory Committee; collaborating with Federal and non-Federal partners on geospatial standards; and supporting the development of the National Spatial Data Infrastructure.

Eliminate Geospatial Research and Reduce 3DEP Technical Support (-$5,100,000/-19 FTE): This reduces support for technical operations and delivery functions within the 3D Elevation Program (3DEP), National Hydrography and Watershed Boundary Datasets, and US Topo Programs, including Alaska mapping. The reduction would eliminate the Center of Excellence for Geospatial Information Science and its associated research grants.

Reduce 3D Elevation Program (3DEP) Functions (-$3,000,000/0 FTE): This defers completion of 3DEP national coverage by five years, delaying until 2033 the complete acquisition of light detection and ranging (lidar) data to enhance landscape-scale, three-dimensional maps for the Nation. The reduction results in a significant loss of leveraged partner funds.

Reduce National Geospatial Program Operations (-$575,000/0 FTE): This reduction would diminish the National Geospatial Program's ability to execute its core activities including delaying major mapping efforts to produce and make available highly-accurate topographic, hydrographic, and geologic data and maps for the American public through the National Map and Federal Geospatial Platform. This reduces equipment, services, and work with Federal, State, and industry partners.

National Cooperative Geologic Mapping Program **(-2,314,000/-5 FTE)**

Reduce National Cooperative Geologic Mapping Program Functions (-2,070,000/-5 FTE): This reduces FEDMAP, STATEMAP, and EDMAP funds proportionately based on the algorithm defined by the National Geologic Mapping Act of 1992 and subsequent reauthorizations. This would eliminate earthquake seismic hazard assessments in central Virginia impacting the USGS's ability to construct seismic hazard maps based upon the latest geologic maps for the central Virginia area. The USGS would reduce the number of geologic maps produced for the Nation; the loss of matching (1:1 match) partner funds from the State Geological Surveys through the STATEMAP grants program doubles this loss. This reduction would also affect EDMAP grants to colleges and universities.

Reduce National Cooperative Geologic Mapping Program Operations (-$244,000/0 FTE): This reduction would diminish the National Cooperative Geologic Mapping Program's ability to execute its core activities including significantly delaying the number of geologic maps produced to current standards for the Nation. This reduces equipment, services, and work with Federal, State, and university partners.

Science Synthesis, Analysis, and Research Program **(-5,702,000/-27 FTE)**

Reduce USGS Library Functions (-$3,000,000/-20 FTE): This eliminates public access to USGS Library locations. The USGS would place all collections into a dark archive; reduce online journal subscriptions by at least fifty percent; and close libraries in three, or possibly all four locations (Menlo Park, CA; Flagstaff, AZ; Lakewood, CO; and Reston, VA).

Reduce Biogeographic Science Functions (-$2,500,000/-7 FTE): This reduction would eliminate all national species occurrence data (e.g., species distributions) and systems, which impacts the USGS's ability to produce and maintain these data. The USGS would also eliminate contracts and partnership agreements with USGS Science Centers, universities, and other Federal agencies for assembling and integrating data on species distribution across the Nation. This would result in other Federal agencies, State, and local governments spending additional funding to individually assemble and integrate non-standard species data. This reduction also eliminates the biodiversity hub of EcoINFORMA (Ecoinformatics-based Open Resources and Machine Accessibility).

Reduce Science Synthesis, Analysis, and Research Program Operations (-$202,000/0 FTE): This reduction would diminish the SSAR Program's ability to execute its core activities including the production and maintenance of species occurrence data; decreasing bibliographic research services; and limiting access to online journals—services essential to all of the USGS's mission areas and Interior science. This reduction would also reduce the ability to maintain and invest in information technologies that are essential to the core mission work of the program.

Science Support

Administration and Management **(-$13,390,000/-140 FTE)**

Reduce Administration and Management Services (-$12,446,000/-140 FTE): A reduction to the A&M workforce would further delay hiring, which impacts mission areas research and prohibits us from meeting the OPM mandated 80-day hiring process. These reductions also limit strategic sourcing initiatives and decrease the timeliness of awards by our acquisition and contract staff, directly impacting the science, along with impacting States and universities that receive grants. In addition, these decreases will also reduce publications of scientific reports that are widely used by decision makers, natural resource planners, and Congress; eliminate youth outreach activities contributing directly to STEM capabilities for the Nation; impact cooperative work with international counterparts; and reduce technology transfers and patent programs resources, impacting our scientific inventions.

Reduce Administration and Management Operations (-$944,000/0 FTE): This reduction would diminish A&M's ability to execute its core activities including hiring, contracting, accounting functions, and other activities that support the science mission of the bureau. This proposed reduction will reduce staff training and travel, procurement of needed equipment and services, and the ability to maintain and invest in information technology that are essential to the core mission work of the program.

Information Services **(-$3,734,000/-5 FTE)**

Reduce Information Services Program (-$3,596,000/-5 FTE): The 2018 budget request would limit resources to fund cybersecurity efforts in the cloud and increases response times to requests for cybersecurity reporting. It would also reduce collaborative and automation activities that support the science mission and eliminate this program's support for the Open Data Initiative, Data.gov and Open Science Initiatives, and reduce resources supporting the Federal IT Acquisition Reform Act (FITARA) compliance. It would reduce investment in the information infrastructure, increasing risk of system failures and loss of science data.

Reduce Information Services Operations (-$138,000/0 FTE): This reduction would limit resources to execute core activities, including cybersecurity, collaborative activities and automation activities that support the science mission of the bureau. This proposed reduction will reduce staff training and travel, procurement of needed equipment and services, and the ability to maintain and invest in information technology.

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