

Climate Resilience and Adaptation to Protect the Nation and Strengthen the Economy

FY 2016 President's Proposed Budget
Total requested increase is \$32,018,000

Climate change requires that the Nation prudently prepare for an increasingly wide range of temperature and precipitation patterns. Changing climate patterns are affecting forest health, wildfire, water resources, biodiversity, coastal habitats, agriculture, and other climate-dependent resources and industries that are vital to the Nation. Adaptation and resilience planning will help our Nation and economy thrive in the face of climate challenges that could affect our infrastructure, food supply, and physical safety. The effectiveness of these responses is dependent upon an integrated, fact-based understanding of physical and biological processes and how various adaptation options can reduce adverse impacts or increase potential benefits.

In various ways and under a variety of headings, the USGS has conducted climate research for more than 100 years. The USGS emphasizes research to support natural resource managers and infrastructure planners who face facing increasingly complex challenges under changing conditions such as drought and sea level rise.

The proposed budget increase in 2016 would support priority research and science activities in four climate-related areas: (1) Adaption and Resilience, (2) Coordination, (3) Climate Toolkit, and (4) Carbon Sequestration.

Adaption and Resilience

Examples of adaptation and resilience measures include using water resources more efficiently; adapting building codes to future climate conditions and extreme weather events; building flood defenses; and developing drought and other weather tolerant crops. In order for resource managers, community leaders, and industry executives to know where to focus their efforts, they must first know which climate change issues are most pressing at which locations.

The requested increase would allow the USGS to expand a research effort begun in 2015 to document historical baseline levels of variability in water resources across the United States, providing context and setting expectations for modern-day patterns of water availability, storms, and other hydrologic events that affect coasts, urban areas, agriculture, and other sectors in our Nation. Because a high concentration of the U.S. population lives along the Nation's coastline,



rising sea level poses significant impacts on society, infrastructure, and coastal habitats that serve as buffers from storm surges and severe weather events. The requested increase would allow the USGS to conduct research to develop consistent methods to measure the amount of water contained in alpine glaciers in order to improve understanding of the potential contributions of melting glaciers and ice sheets to sea level.

Water supply and demand are important issues in the Colorado River Basin where relative effects on water availability of climate variability versus human modification of the landscape are poorly known. Changes in fire frequency, arroyo cutting, and human-altered hydrology, for example, have been observed since the mid-19th century. The proposed increase would allow USGS researchers to develop pre-settlement and modern land cover datasets in a consistent format for input to regional climate sensitivity experiments. The datasets will be used in a regional climate model simulation to conduct paired pre-settlement and present-day simulations that can be used to support effective planning and management needs.

Coordination

Many Federal, State, tribal and other entities are conducting vulnerability assessments. These entities need to be able to easily access the findings of completed or ongoing assessments learn from existing methods and data to develop new studies, and combine results to provide larger and more meaningful conclusions. In 2016, the USGS would work with an existing interagency/State coordination group and tribes to continue development of a public cross-agency database and field guide to vulnerability assessments. This project would support Interior and other agencies in establishing standards and best practices, tracking progress for such assessments, and strategically prioritizing adaptive management actions.



Assuring that Federal, State, and other scientific activities are effectively devoted to high priority needs requires an increased level of coordination. The requested increase would allow the USGS to develop and implement the technical means to track relevant climate change adaptation-science across Federal agencies and ensure the availability of this information in a Web accessible format at the regional and national scale. Additionally, the Department of the Interior Climate Science Centers (CSCs) would continue to work with regional partners to ensure coordinated implementation of public science investments. Investment in better coordination allows the USGS to better leverage the capacity and expertise of existing institutions, eliminate redundancy, make maximum use of existing data, and better support the needs of decisionmakers.

Community Resilience Toolkit

Communities across the Nation face growing environmental challenges from natural hazards such as drought, floods, storms, and wildfires. The Community Resilience Toolkit will improve community resilience by providing tools (e.g. improved access to basic real-time data, such as rainfall; modeled visualizations of flood inundation and storm surges) that help Federal, State, local and tribal governments improve their planning to maximize public safety and economic sustainability when these hazard events occur. An example would be the USGS leveraging funding to develop Web services that will apply the Observations and Measurements Data Model, an International Standards Organization standard, on priority climate data. This effort would provide an application that makes it easier for scientists and others to access, integrate, and apply their information. Leveraging the National Geospatial Platform, this effort would increase the availability of USGS climate data that is required to support more informed landscape level decisionmaking.

Carbon Sequestration

Biological carbon sequestration refers to both natural and deliberate processes by which carbon dioxide is removed from the atmosphere and stored as carbon in vegetation, soils and sediments. The Energy Independence and Security Act of 2007 (P.L. 110-140) called for the Secretary of Interior to complete a quantitative national assessment of the carbon stored in and released from the Nation's ecosystems. The biological carbon sequestration national assessment will be completed in 2015 for all 50 States. This national assessment will help inform land management policies and provide tools for natural resource managers to account for the carbon impacts of routine management practices as well as future climate adaptations.

As Interior manages one-fifth of the Nation's lands, the Department is an obvious candidate to lead the Federal government in establishing a national carbon inventory and tracking system. On those lands, the Bureau of Indian Affairs, Bureau of Land Management, the U.S. Fish and Wildlife Service, National Park Service, and Office of Wildland Fire have a shared need to incorporate into their resource management decisions both current science and regional stakeholders' values for uses (ecosystem services) of the land, ranging from recreation to carbon management.

In 2016, the biological carbon sequestration project would develop methodologies for updating critical input data, streamline biogeochemical models for calculating carbon stocks and sequestration, and engage an interdisciplinary team of scientists for evaluating and documenting results. The project would also conduct research and development for reducing carbon stock and sequestration uncertainties. USGS scientists will continue to work with Interior land managers to determine how water level management on National Wildlife Refuges, for example, can enhance or decrease carbon stored in the systems they manage.

In 2016, the biological carbon sequestration project would initiate a grand challenge leveraging this initial assessment to implement a carbon inventory and tracking system for carbon stocks and flows on all Interior lands, complete with online tools to support regional natural resource decisionmaking.