

Statement of
Jerad Bales, Acting Associate Director, Water
U.S. Geological Survey
Department of the Interior
before the
Committee on Natural Resources
Subcommittee on Water and Power
U.S. House of Representatives
April 16, 2013

Good afternoon, Mr. Chairman and Members of the Subcommittee. My name is Jerad Bales, and I am the Acting Associate Director for the Water Mission Area at the U.S. Geological Survey (USGS). Thank you for the opportunity to appear before you today to discuss the Administration's 2014 budget request for the USGS, and in particular for water resources.

At a time when the competition for water resources is growing and reaching critical levels in many areas, the public needs to have relevant, timely, and trustworthy information about water quantity and quality. Science holds the key to providing the answers that meet this need. Technical excellence and unbiased scientific results are the hallmark of the USGS water programs.

For more than 130 years, the USGS has provided a scientific foundation geared toward having the best available science for informed decision making—a foundation built by the creative intelligence of thousands of dedicated scientists. As the primary Federal science agency for water information, the USGS monitors and assesses the amount and quality of the Nation's freshwater resources, assesses sources and behavior of contaminants in the water environment, and develops tools to improve management and understanding of water resources. This information contributes to wise physical and economic development of the Nation's water resources for the benefit of present and future generations.

The Fiscal Year 2014 overall budget request for the USGS is \$1.2 billion, an increase of \$98.8 million from the 2012 enacted level. The request supports a balanced science investment portfolio that is essential to a healthy science agency and a strong and resilient Nation. Investments in research and development (R&D) within the USGS will promote greater understanding in managing the Nation's water resources and will support U.S. economic growth and innovation.

USGS Science that Focuses on Water Resources

The Fiscal Year 2014 budget request for USGS Water Resources is \$222.9 million, a net increase of \$13.3 million above the 2012 enacted level. The 2014 USGS budget request reflects a careful prioritization of science investments to promote the understanding of freshwater availability and use nationwide; enhance groundwater monitoring; support a national streamgauge program; and assess if water quality is getting better or worse.

I will provide a few examples of USGS water science at work to support the national economy, reduce risk from natural hazards, and provide a solid scientific foundation for decisions.

A Report to Congress on the Progress of the National Water Census

In early April, the former Secretary of the Interior Ken Salazar released a report to Congress on the progress of the National Water Census (Water Census), which is being developed at the USGS to help the Nation address its critical water needs. The Water Census will provide the first nationwide assessment since 1978 and will give the Nation new information about the availability and use of America's freshwater resources.

The Water Census will assist water and resource managers in understanding and quantifying water supply and demand and will support more sustainable management of water resources. The report describes the "water budget" approach being taken to assess water availability for the Nation. Water budgets account for the inputs to, outputs from, and changes in the amount of water in the various components of the water cycle. They are the hydrologic equivalent of the deposits to, withdrawals from, and changes in the balance in a checking account and provide the hydrologic foundation for analysis of water availability.

The USGS is initially focusing on areas with significant competition for water availability and existing or emerging conflicts over water supply, such as the Delaware, Colorado, and Apalachicola-Chattahoochee-Flint River Basins. Increasing populations, more volatile stream flows, energy-development and municipal demands, and the uncertain effects of a changing climate amplify the need for an improved understanding of water use and water availability in these crucial watersheds. The USGS will continually be updating the Water Census, adding to it, and improving the accuracy of the various water budget components.

The Water Census is a component of the Department of the Interior's WaterSMART initiative (Sustain and Manage America's Resources for Tomorrow), which USGS participates in together with the Bureau of Reclamation, and fulfills a requirement under the SECURE Water Act, part of the Omnibus Public Lands Management Act of 2009. The report, Progress Toward Establishing a National Assessment of Water Availability and Use, is available at: <http://pubs.usgs.gov/circ/1384>.

The Fiscal Year 2014 USGS budget request for Water Census overall is \$22.5 million, of which \$16.7 million is in the USGS Water Mission Area disbursed throughout multiple programs.

Streamgages—Measuring Water's Flow and Height

The Fiscal Year 2014 budget request includes \$36.2 million for the National Streamgage Information Program, a \$7.3 million increase above the Fiscal Year 2012 enacted budget and \$63.0 million for the USGS Cooperative Water Program, or \$0.4 million above the Fiscal Year 2012 enacted budget.

USGS streamflow information, currently collected at more than 8,000 streamgages nationwide, provides the scientific basis for protecting, managing, and sustaining freshwater that is safe and available for drinking and for other competing water demands, including irrigation, energy, industry, recreation, and ecosystem health. The information is available in real time, which is critical to protect communities and minimize loss of life and property from water hazards, including floods, droughts, and debris flows.

Of the more than 8,000 USGS streamgages, about 3,100 meet targeted, long-term priorities established by the USGS National Streamflow Information Program (NSIP). The NSIP streamgage network is designed to meet Federal responsibilities associated with forecasting floods; monitoring flows across international, interstate, and Tribal borders; tracking flow in major river basins; and assessing long-term climatic, land use, and human impacts on streamflow and water quality in different environmental settings across the Nation.

The remaining 5,000 streamgages in the USGS network help address NSIP and other national priorities related to hazard mitigation and water availability for human and aquatic system health. Specifically, these streamgages facilitate decisions, operations, and responsibilities by localities, States, Tribes, and other Federal agencies, including management of reservoirs, drinking-water intakes, groundwater pumping, and water-quality permitting. These streamgages also fill in network gaps by monitoring a broader range of watersheds and hydrologic conditions than can be covered by the NSIP streamgages alone. Such robustness is also critical to support statistical modeling that allows estimation of streamflow at ungaged streams.

The USGS streamgage network depends on partner funding. Currently, about two-thirds of funding comes from about 850 local, State, tribal, and Federal partners. USGS appropriated funding from the network comes from different line items including NSIP, the Cooperative Water Program (CWP), National Water Quality Assessment Program, Hydrologic Networks Program, and the National Research Program, all of which fund specific streamgages for individual program objectives. Most USGS streamgages provide information for more than one use. Shared funding ensures the engagement of all levels of government in the network operation, keeps the network relevant, and drives the USGS to focus on cost-effective performance and on network optimization and leveraging.

The USGS has an extensive network of streamgages in all 50 States and Territories. With the proposed funding increases, the USGS will be able to fully fund 100 additional streamgages, as well as partner with other agencies on 200 more streamgages. In addition, the USGS will also be able to invest in research and development on the next generation of streamgages. These streamgages will make use of the latest in remote sensing, bathymetry, and particle imagery to deliver streamflow information while achieving cost efficiencies.

In most years, flooding causes the greatest amount of property damage and loss of human life of all natural disasters. One of the most effective ways of reducing these losses is advance warning of the flood and knowledge of the areas that are likely to be flooded. The National Weather Service (NWS) provides flood forecasts using models that are calibrated, checked, and verified with USGS-supplied streamflow information. Recently, the USGS has helped develop a new tool called a flood inundation map library to assist first responders and the general public in

knowing what areas will be flooded and how deep those flood waters will be for a given storm based on the NWS flood forecast. Real-time flood inundation map applications run flood simulations and create maps “on the fly” during a flood, using real-time data. The maps are freely available to anyone at any time. For 2013 and 2014, additional rivers will be mapped for estimates of flood inundation. The USGS will continue to work with other Federal agencies (NWS, Corps of Engineers, and Federal Emergency Management Agency), state emergency management agencies, and private companies to enhance and provide consistent flood inundation maps for the public and emergency responders.

NSIP has helped develop and utilize rapid-response streamgages that can be rapidly delivered and put into operation providing real-time streamflow information to the USGS and others via the Web within an hour of arriving on site. Rapid response gages provide information to emergency responders about floods that help identify areas at greatest risk. These streamgages have also been used as a back-up streamgage where permanent streamgages have been lost or were in danger of being inundated. These temporary streamgages can also be used in areas with recent wildfires to measure the changes caused by the fires and to better describe and understand aquatic habitat, both natural conditions and disturbed. In most cases, the rapidly deployable streamgages can be shipped within a day and can stay in operation for a few days to a few years. For 2013 and 2014, the goal will be to develop additional real-time streamgages and deploy them in flood situations, drought areas, recent wildfire areas, and habitat assessment areas.

NSIP also provides regional assessments and interpretation of streamflow information to provide estimates of streamflow at ungaged locations and to identify trends in streamflow due to changing land use, water use, and climate. These regional products directly support a priority of the national Water Census, to inform the public and decisionmakers about resource availability. In 2013 and 2014, methods and technologies will be investigated and developed for future applications.

Groundwater Resource Assessments

The Fiscal Year 2014 budget request for the USGS Groundwater Resources program is \$12.7 million, an increase of \$4 million above the 2012 enacted level. The increase will enable much-needed aquifer assessments, continue cutting-edge research and technological advancements, and allow the USGS to move from the current pilot stage and begin full implementation of a national Groundwater Monitoring Network, as authorized under the SECURE Water Act. The proposed network would bring monitoring data from the USGS together with data from States and other partners.

Groundwater is one of the Nation’s most important natural resources. It is the primary source of drinking water for nearly half of the Nation’s population, provides 40 percent of the irrigation water necessary for the Nation’s agriculture, sustains the flow of most streams and rivers, and helps maintain a variety of aquatic ecosystems. The USGS Groundwater Resources Program:

- Provides fundamental information about groundwater availability in the Nation’s major aquifer systems;
- Characterizes natural and human factors that control recharge, storage, and discharge in the Nation’s major aquifer systems and improves understanding of these processes;

- Develops and tests new tools and field methods to analyze groundwater flow systems and their interactions with surface water; and
- Provides scientific leadership across all Federal programs about the Nation’s groundwater resources, including research directions, quality control, technology transfer, and information storage and delivery.

In 2013 and 2014, the USGS expects to conduct an evaluation of the Hawaiian volcanic-rock aquifers. These aquifers are the main and most reliable source of drinking water on the islands, supplying water to 1.4 million residents, diverse industries, and a large component of the U.S. military. Also, in 2014, the USGS expects to assess the Ozark Plateaus Aquifer system, impacting Arkansas, Kansas, Missouri and Oklahoma. This is predominately a freshwater system that is almost entirely surrounded by (but hydraulically isolated from) the neighboring saline groundwater flow system. Groundwater from the Ozark aquifer is the primary source of freshwater for most public supply systems that use groundwater exclusively and for most self-supplied domestic water users in the area. Population within the study area has steadily increased to over 6.4 million people as of the 2010 Census, and the area is experiencing a corresponding increase in commercial, industrial, and residential water demand.

Additionally, initial modest steps have been taken to begin working on the development of a groundwater monitoring program for each major aquifer system in the United States, as required in the SECURE Water Act. The National Groundwater Monitoring Network is being proposed as a collaborative monitoring network among Federal, Tribal, State, and local agency data providers. So far, a pilot project in six states provides groundwater levels and quality information to the public. In 2013 and 2014, data collection and groundwater level monitoring network activities will continue to provide improved access to groundwater information. Moreover, in 2013 and 2014, the USGS Groundwater Resources Program will support the continued evolution of the USGS Modular Groundwater Flow Model, or MODFLOW, the most widely used groundwater flow model in the world, which is used to solve practical problems in the study of groundwater. New features will be added to model to incorporate advancements in the understanding of groundwater hydrology, respond to changes in user needs, and take advantage of constantly increasing computer power.

Assessing Water Quality Nationwide

The Fiscal Year 2014 budget for the USGS National Water Quality Assessment (NAWQA) Program is \$62.0 million, or an increase of \$0.4 million above the Fiscal Year 2012 enacted budget.

Congress established the USGS National Water Quality Assessment (NAWQA) program in 1991 to address the fundamental questions, “What is the status of the Nation’s water quality, and is it getting better or worse?” Since then, the NAWQA Program has been a primary source of objective and nationally consistent data and information on the quality of the Nation’s streams and groundwater.

Restoring and enhancing water-quality monitoring networks, particularly for surface water, and continued development of water-quality models are the two highest priorities for the NAWQA

program during the next decade. NAWQA will continue to focus on nutrients, sediment, pesticides and other contaminants in key agricultural and urban settings in the Mississippi River Basin and waters flowing into other important estuaries, such as Chesapeake Bay, San Francisco Bay/Delta, and Puget Sound. Water-quality monitoring in 2013 will be done at 100 of the 313 sites recommended in the science plan for the third decade of NAWQA. Five monitoring sites will be instrumented with state-of-the-art water-quality sensors that will provide real-time, continuous data for selected water-quality constituents including nitrate, dissolved organic carbon, and turbidity. These data will provide the ability to improve in-stream estimates of nutrient and sediment loads that are the basis for water-quality models.

In 2013, the first of a planned series of targeted regional water-quality monitoring studies will focus on the stream quality in the heavily agricultural upper Midwest, a region encompassing parts of 10 States. The Midwest Stream Quality Assessment is being designed in collaboration with the States and the U.S. Environmental Protection Agency (EPA) to complement its assessments of ecological conditions under the EPA National Rivers and Streams Assessment program.

In 2014, NAWQA will continue to work towards expanding the national network of long-term water-quality monitoring sites to support the goals of the program by partnering with other USGS programs, States, and other organizations in key undeveloped, agricultural, and urban settings in the Mississippi and other major river basins throughout the United States. Water-quality models that estimate nutrient and sediment loads will be updated and enhanced in four large regions (West, Southeast, Northeast, and Mississippi River Basin). Planned enhancements include providing improved spatial resolution and updated contaminant source data; in addition simulation of seasonal to annual variations in streamflow and contaminant concentrations and loads will improve decision-support tools used for evaluating how nutrient and sediment loads will change in response to changes in climate, land use, or management policies

NAWQA is the only Federal program that monitors the status of the Nation's groundwater quality and reports on how these conditions are changing over time. If resources are sufficient, USGS will conduct groundwater monitoring in 16 principal aquifers that collectively account for more than 75 percent of the groundwater used as a source of drinking water for the Nation. Groundwater-quality data for the California Central Valley, Coastal Lowlands of the Carolinas, Glacial, and Northern Atlantic Coastal Plain principal aquifers will be combined with flow models produced by the Groundwater Resources Program to provide a three-dimensional assessment of the amount of groundwater available, its vulnerability to contaminants derived from natural and (or) human sources, and an understanding of how groundwater quality will respond to changes in climate, overlying land use, and water use over time. Initial testing will be done during 2013 in the California Central Valley.

In 2014, the NAWQA Program will also devote efforts to begin a national synthesis of knowledge on the degree to which water quality influences the quantity of water suitable for both human and ecosystem uses – a goal within the National Water Census. The efforts will include publishing the results of water-quality assessments of five of the Nation's principal aquifers.

Water Resources Research Institutes

The Fiscal Year 2014 budget proposes \$1.0 million for State Water Resources Research Institutes (WRI), a \$5.5 million reduction from the Fiscal Year 2012 enacted budget. The proposed budget reduction would eliminate funding of the annual base grants. The competitively awarded portion of the program would continue. The USGS will work with the program in 2013 and 2014 to develop more rigorous oversight of the program and ensure that Federal investments at each of the Institutes effectively and consistently maximize national science goals and leverage all available resources, particularly in the areas of water availability, quality, and climate change.

Conclusion

For more than 130 years, the USGS has provided impartial scientific information to enable the public, resource managers, emergency responders, and policymakers to make informed decisions on the basis of sound information. The USGS Fiscal Year 2014 budget request represents a balanced focus on monitoring, research, and assessments while maintaining the diverse expertise necessary to respond to evolving science needs. It reflects careful and tough decisions, made within a fiscally constrained environment, to prioritize science investments that support a resilient and robust economy, while also protecting the health and environment of the Nation and its people.

This concludes my statement, Mr. Chairman. I will be happy to answer the questions you and other Members have regarding the 2014 budget proposal for USGS water resources.