

## Activity: Water Resources Investigations

### Subactivity: Cooperative Water Program

	2009 Actual	2009 Recover Act <sup>3</sup>	2010 Enacted	2011			Change From 2010 (+/-)
				DOI-Wide Changes <sup>1,2</sup> (+/-)	Program Changes (+/-)	Budget Request	
Cooperative Water Program (\$000)	64,078	0	65,561	-1,963	0	63,598	-1,963
<i>Total FTE</i>	<i>679</i>	<i>0</i>	<i>676</i>	<i>-20</i>	<i>0</i>	<i>656</i>	<i>-20</i>
1) \$1,134 in fixed costs is absorbed. 2) See the General Statement and Section G for Details on DOI-wide Changes. 3) A new treasury account was created for the Recovery Act appropriations; direct allocations to programs were not made.							

### Justification of 2011 Program Changes for the Cooperative Water Program

The 2011 budget request for the Cooperative Water (Coop) Program is \$63,598,000 and 656 FTE. There are no program changes for the Cooperative Water Program in 2011.

### Program Overview

For more than 100 years, the Coop Program has been a highly successful cost-sharing partnership between the USGS and States, local governments, and Tribes. This partnership provides support for a majority of the USGS national hydrologic data network, including approximately 4,700 of 7,500 streamgages, 10,000 groundwater observation wells, and 2,500 water-quality monitoring sites. The Coop Program is successful because it:

- Combines Federal and non-Federal resources in addressing many of the Nation's most pressing water resource issues, resulting in shared benefits and cost savings to both the Federal Government and the States;
- Conducts studies across the Country in each of the 50 States, Puerto Rico, and U.S. Trust Territories, allowing the USGS to form a national view of important water-resources issues and potential solutions;
- Uses standardized methods of data collection and analysis across the Country, so that information can be aggregated into national databases, results of studies are comparable from one State to another, and knowledge gained from one study has transfer value to understanding the hydrology in other parts of the country;
- Helps resolve inter-jurisdictional disputes by assessing conditions at and across State boundaries and by assuring all parties that the data and results of investigations are objective and are equally available to all parties; and
- Links State USGS offices with the larger national USGS infrastructure. This infrastructure includes the National Water Quality Laboratory, NWIS, the NRP, instrumentation testing facilities, a national quality assurance system, and the breadth of other expertise available throughout the Bureau.

## Cooperative Water Program

---

In addition to providing information responsive to State or local needs, the Coop Program provides information that supports the activities of many Federal agencies. Some of these activities are:

- Forecasting floods
- Managing surface-water supplies
- Monitoring hydroelectric power demand
- Setting waste disposal limitations
- Regulating industrial discharges
- Designing highway structures
- Measuring the downstream transport of pollutants or nutrients
- Determining total maximum daily loads
- Evaluating mine permits
- Evaluating fish habitat
- Quantifying Federal reserved water rights
- Quantifying Indian water rights
- Managing interstate compacts and Indian water rights settlements

The goals of the Coop Program directly support the USGS Science Strategy and focus on providing scientific information on the water availability and quality of the United States as a means to inform the public and decisionmakers about the status of its freshwater resources and how they are changing. The efforts of Coop Program scientists also support USGS Science Strategy themes of understanding ecosystems and predicting ecosystem change, providing a scientific foundation for energy and mineral resources for America's future, climate variability and change, a national hazards, risk and resilience assessment program, and the role of the environment and wildlife in human health. The Coop Program is conducted in conjunction with other USGS programs and an array of reimbursable projects funded in cooperation with partner agencies.

This program effectively leverages Federal appropriations, working with State, local, municipal, and Tribal officials to develop a program that responds to both local and national needs and attracts more than two non-Federal dollars for each Federal dollar appropriated. This program of shared costs and shared benefits provides a foundation for the USGS national hydrologic networks that give USGS the ability to conduct regional and national water resource assessments. As the result of an anticipated reduction in cooperator funding, there may be a decrease in the hydrologic program and FTE supported by the Coop Program in 2011.

Program accomplishments in 2010 included:

**Environmental Restoration:** Chesapeake Bay River Input Monitoring (RIM) Program—2009 marked the 30<sup>th</sup> consecutive year that USGS monitored the quality of major rivers that drain to the Chesapeake Bay and measured the flux of nutrients and sediment being transported to the Bay. This long-term cooperative effort with the States of Maryland and Virginia and the U.S. Environmental Protection Agency provides essential information on one of the major stressors to the Chesapeake Bay and is used to determine the effectiveness of the multi-billion dollar effort to restore the Bay. Recent technical advancements in the RIM program have focused on improving statistical methods used to compute the amount and trends of nutrient and sediment delivery to the Bay and to effectively communicate those results to the public. The long-term commitment of USGS and its cooperative partners to provide this quality assured data and

information has been essential for scientists, policymakers, and the public to better understand the dynamics of nutrient delivery to the Bay and to develop effective nutrient management strategies in the Bay watershed. This work will need to be sustained for many years to come, as we continue to restore this valuable but highly stressed resource.

**2009 Flood Response: Atlanta** – The USGS maintains a network of real-time streamgages with rainfall sensors that provided critical hydrologic information during epic flooding in September 2009 that affected a vast area of the Atlanta metropolitan area. Post-storm analyses showed that this flood well-exceeded the 0.2 percent chance (500-year) flood magnitude at many locations. In comparing to other major floods nationwide, the Atlanta 2009 flood is now regarded as one of the most significant floods of the past century. USGS streamgages and interpretive analyses provided early warning to the National Weather Service, State and local emergency management officials, and county cooperators to make informed decisions in real-time concerning the protection of lives and property from floodwaters. According to William J. Higgins, Storm Water Division Manager of the Cobb County Water System, “Reading real-time data from the network of gages throughout the County and surrounding areas helped us direct Emergency Services to the points where they were needed most and may well have contributed to saving lives. Thankfully no lives were lost here in Cobb County during that flood, and I believe the USGS gages had a part in that.” Elsewhere in the Atlanta metro area, the flood resulted in more than \$195 million in damages and 10 lives lost. Without the USGS streamgaging network in place and the efforts of USGS personnel to keep the network calibrated, Kent Frantz with the National Weather Service says that “losses from this flood would have been much worse” since citizens would not have been able to be warned to evacuate themselves and their property from threatened areas.

**Water Availability: Yakima Basin Groundwater Assessment**—In 2009, the USGS completed a 5-year assessment of the groundwater resources of the Yakima Basin in Washington State that resulted in 11 published reports. Like many Western U.S. basins, the Yakima basin water supply is considered to be over-allocated; there is growing demand for new uses; and there is a need to better understand the effects of surface and groundwater withdrawals so that water from these connected resources can be fairly allocated. This USGS study, conducted in cooperation with the Washington State Department of Ecology (Ecology), the Yakama Nation, and the U.S. Bureau of Reclamation (Reclamation) was designed to better define the occurrence of groundwater in the Yakima basin and determine its connection to surface water resources. The primary product of this work is a coupled groundwater and surface water computer model that can be used to assess potential management strategies and to estimate the extent of the effect that groundwater pumpage has on streamflow. The latter is important because senior surface-water rights, including Tribal water rights and in-stream flows for ESA-listed salmonids can be influenced by groundwater withdrawals. The project's products and tools will provide the necessary information to efficiently manage the precious water resources for both in-stream and out-of-stream uses. The USGS work is highly regarded by the stakeholders in the basin. According to Tom Mackie of the Washington State Department of Ecology Central Regional Office, “the work is of the highest quality, and the USGS is seen as more of an independent third party.”

**Resource Assessments: Nebraska Surficial Aquifers** – In cooperation with local Natural Resources Districts, the USGS is deploying new geophysical techniques as an innovative methodology for efficiently characterizing Nebraska’s valuable groundwater resources. In 2009, the USGS conducted Helibourne Electromagnetic Surveys (HES) to characterize the hydrogeologic framework and water bearing capacity of Nebraska’s surficial aquifers. This new technology, being developed by the USGS in association with local, university, and international

partners, has proven successful in detecting water in a much more efficient and cost effective manner than traditional well drilling techniques. The HES surveys provide important information for better understanding the impacts of current and future groundwater withdrawals on both surface and groundwater resources. This information is of particular importance in managing groundwater withdrawals of over-appropriated or fully-appropriated river basins, such as the Republican, North Platte, and Central Platte river basins. Duane Woodward, Engineering Hydrologist with the Central Platte Natural Resources District, notes that the “study being conducted by the USGS in cooperation with Central Platte Natural Resources District (NRD) will provide valuable aquifer properties information to manage the groundwater resources across the Central Platte NRD,” an area that encompasses one million acres of irrigated agriculture supplied by more than 17,000 high capacity water supply wells.

### 2011 Program Performance

The Coop Program includes three major components:

#### **Data Collection Activities**

(Estimates for 2009, \$34.8 million; 2010, \$35.6 million, 2011 \$34.5 million)

Over the past few years, the Coop Program has provided sole Federal support or partial support for over half of the sites where the USGS collects data on surface-water levels and flow, groundwater levels, and groundwater quality. The Coop Program supports collection of data on surface-water quality, which is important to States to comply with the requirements of the Clean Water Act, and collection of streamflow data that are important to water supply planners to identify the influence of climate variability and climate change on water availability.

These data provide resource managers with the information they need to determine the suitability of water for various uses, identify trends in water quantity and quality, and evaluate the effects of various stresses on the Nation's groundwater and surface water resources. The data collected at USGS monitoring sites is provided free of charge on the Internet. This includes historical data as well as real-time data. The real-time data are used routinely by emergency management agencies, State and municipal agencies, businesses, irrigators, and recreational users.

Most USGS data collection stations serve multiple purposes and many are funded, wholly or in part, through joint-funding agreements. Normally, these stations, though funded by various organizations, are operated as part of an integrated network that provides benefits to a broad community of users and comprise the majority of the USGS national hydrologic data network.

#### **Interpretive Studies**

(Estimates for 2009, \$23.1 million; 2010, \$23.6 million; 2011, \$22.9 million)

In addition to data collection activities, the Coop Program supports about 700 hydrologic studies each year. Water resource studies define, characterize, and evaluate the extent, quality, and availability of water resources. The results of these investigations are published and provided to cooperating agencies, which use them as the basis for managing the water resources for which they are responsible. Also, these investigations provide information that can be synthesized and applied to a variety of hydrogeologic and climatic settings across the Nation, greatly expanding the usefulness and transferability of USGS study results nationwide.

### Technical Support

(Estimates for 2009, \$6.2 million; 2010, \$6.3 million; 2011, \$6.2 million)

The USGS has a long tradition of providing national and regional technical support for its geographically distributed water resources studies. This support provides quality control to ensure the technical excellence of water resources field programs and assures that data collected by Water Science Centers in each State are of equivalent quality and suitable to be included in USGS national hydrologic data bases. Technical support also provides a structured way of transferring new technology to USGS investigative and data activities in each State, and provides a mechanism to make water resources information available to other agencies, the scientific community, and the public.

Topical areas of focus in 2011 align with the USGS Science Strategy and include the following:

**Water availability** —In 2011, the Coop Program will support thousands of streamgages and groundwater observation wells that define the availability of surface and groundwater, and will conduct numerous hydrologic investigations needed to evaluate the quantity and use of available surface and groundwater. These data and investigations will serve as a foundation upon which the proposed USGS WaterSMART Availability and Use Assessment will be built.

**Drinking water** —With many partners, the USGS is developing an understanding of natural and human factors that affect groundwater quality, providing early indications of potential water-quality problems and contributing to the long-term management and protection of groundwater resources affecting one in eight Americans.

**Ecosystem services** —Through the Coop Program the USGS is working with State and local agencies to evaluate the in-stream flow requirements of aquatic ecosystems, which addresses a key issue of water use for environmental and wildlife needs. This effort entails the development of both new information and new techniques.

**Hydrologic Hazards** — Real-time streamflow information from streamgages funded through the Coop Program is used by the NWS to provide flood forecasts to local communities. Local emergency responders use this same information in evacuating at risk populations from flooded areas. In addition, flood-frequency analyses conducted as a part of the Coop Program interpretive studies serve as the foundation for the design of flood control structures and delineation of flood prone areas, an essential component of the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program.

Cooperative Water Program

Program Performance Overview

End Outcome Goal 1.4: Improve the understanding of National Ecosystems and Resources through Integrated Interdisciplinary assessment.

End Outcome Measure / Intermediate Measure	2006 Actual	2007 Actual	2008 Actual	2009 Plan	2009 Actual	2010 Plan	2011 Plan	Change from 2010 Plan to 2011	Long-term Target 2012
<b>Intermediate Outcome Measures and Bureau and Outcome Measures</b>									
<b>Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making</b>									
# of water monitoring sites supported jointly with State, local, and Tribal Cooperators where surfacewater and groundwater quality and quantity data are measured to support water resource management decisions related to water supply, the health and recreational value of aquatic ecosystems, and floods and droughts (COOP)	A	21,800	21,800	20,600	20,600	20,000	19,500	-500	19,000
# of knowledge products on the water availability and quality of the Nation's water resources provided to support management decisions (COOP)	A	250	250	237	237	230	225	-5	225
<b>Total projected cost (\$000)</b>	<b>UNK</b>	<b>50,000</b>	<b>50,000</b>	<b>47,400</b>	<b>47,400</b>	<b>46,000</b>	<b>45,000</b>	<b>-1,000</b>	<b>45,000</b>
# of retrievals of groundwater and surface-water quantity and quality data and Information (GWRP)	A	108.19M	132.60M	153.98M	153.98M	166.30M	174.61M	+8.31M	183.34M