Federal-State Cooperative Water Program Subactivity

Program	1999 Estimate	Uncontrol. & Related Chgs	Program Redirect	Program Changes	FY 2000 Budget Request	Change from 1999
Federal-State Cooperative Water Program	70,137	2,177	-11,458	-2,500	58,356	-11,781
Total Requirements $000	70,137	2,177	-11,458	-2,500	58,356	-11,781

Note: The Program Redirect column reflects the redirection of funds to the Integrated Science, Science Support, and Facilities activities.

Current Program Highlights

A vital cornerstone of the USGS mission is the continuous assessment of the Nation's water resources. This is a huge and expensive task. Throughout its 103-year history, the Federal-State Cooperative Water Program (Coop Program) has enabled the USGS to partner with State and local water resource agencies in carrying out this important part of its mission. The Coop Program also has provided technical assistance to State and local water management agencies (including Indian Tribes) in seeking solutions to water-resource issues of national concern through a matched funding arrangement. The cooperating agencies provide at least half the funding; USGS does most of the work. These provisions result in an effective cost sharing arrangement and ensure that data collection, archiving, and analysis are conducted with consistent techniques that allow a truly national resource assessment.

The Coop Program has been highly successful for several reasons. From a Federal perspective, the Coop Program combines Federal and non-Federal resources in addressing many of the Nation's most pressing water resource issues. Coop studies are conducted in each of 50 States; the knowledge gained from these studies contributes significantly to understanding the hydrology in all parts of the country. By bringing together and synthesizing the results of studies on common topics in various hydrogeologic and climatic settings, the Coop Program enables the USGS to form a national picture of important water-resource issues and potential solutions at great cost savings to the Federal Government.

From a State and local perspective, having an objective Federal science agency provide high-quality data and information on issues of importance to them is a vital service for which they are willing to share the cost. By using standardized methods of data collection and analysis across the country, the USGS ensures that its high quality information and results are comparable from one State to another. Rivers and aquifers cross jurisdictional lines; studies and data collected in one county or State have great value to adjourning counties and States. Therefore, water managers at all levels appreciate that information developed by the USGS is provided to all potential users, public and private, on an equal basis. Also, cooperators understand that USGS staff in their State have ready access to a wide variety of USGS

expertise across the country in such areas as database management, quality assurance, and research in all areas of hydrology. For these reasons, data collected by the USGS and the results of its studies are accepted as valid by parties on both sides of disputes and furnish the basis for many water allocation compacts, court decrees, and resource planning activities among and within States.

Within the Coop Program, about half of the funds are used to support Data-Collection Activities; the remaining funds are used for Interpretive Studies. In an effort to maximize the usefulness of hydrologic data and the results of interpretive studies, the USGS continues to enhance its efforts to compile and analyze information resulting from these activities in various States into Regional and National Synthesis products using modest funding from other USGS programs. The following sections highlight these aspects of the Coop Program.

Data-Collection Activities — Cooperatively funded hydrologic data collection activities are underway in every State, Guam, Puerto Rico, and the U.S. Virgin Islands. Most of the USGS data collection stations serve multiple purposes and are at least partially funded through cooperative agreements. When cooperating organizations, whether Federal, State, or local, provide funds to help support USGS data-collection stations, they also support a part of the entire integrated network. For this reason, these organizations are billed on the basis of the AVERAGE cost of the station, rather than the ACTUAL cost of the station within that State. This procedure benefits these organizations and the USGS in two ways. Administrative costs are reduced because financial transactions are simplified; and definitive cost information is available to all parties for planning purposes at the beginning of the fiscal year. This arrangement also assures that data collection in remote areas does not become prohibitively expensive, causing the network to emphasize only those areas close to USGS offices.

In addition to providing information responsive to State or local needs, the Coop Program stations (see Figure W-5, page 188) provide information that satisfies the needs of many Federal agencies. Some of these needs are as follows:

- Forecasting floods
- Managing surface-water supplies
- Monitoring hydroelectric power production
- 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
- Planning and evaluating land reclamation
- Evaluating fish habitat
- Quantifying Indian water rights
- Quantifying Federal reserved water rights

Figure W-5, on page 188, shows that in FY 1998 the Coop Program provided sole support for almost 60 percent of the continuous record streamflow measurement stations in the total USGS network. In combination with other funding sources, the Program provided partial support for another 7 percent of the total network of these stations.

Of the 7,101 continuous record streamflow measurement stations operated by the USGS in FY 1998, about 4,200 are used by the National Weather Service (NWS) for flood forecasting of which most are fully or partially funded by the Coop Program. By long-standing agreement, the NWS provides no funds for these stations, just as the USGS provides no funds to the NWS for meteorological data. Thus, the USGS and hundreds of State and local agencies are

providing the data to support flood forecasting—only one of many uses for which the stations are funded. In addition, the benefits of this forecast information typically extend for many miles along the river, far beyond the jurisdictional limits of the funding agency. Data from about 4,000 of these stations are now also being provided freely on the World Wide Web to all interested parties. The data (presented in graphical or tabular form) are generally less than 4 hours old, and are used by emergency management agencies, State and municipal agencies, businesses, and recreational users of the rivers.

In FY 1998, the Coop Program supported the collection of data on ground water levels at 20,315 public and privately owned wells. Water level data are used to assess changes in ground water storage that can result from natural causes (such as drought) or from human activities (such as ground water pumpage). Selected water quality measurements are made at about 23 percent of those wells. Overall in FY 1998, the Coop Program supported about 76 percent of USGS activities in ground-water data collection. These data provide information necessary for the determination of the suitability of water for various uses, identification of trends in water quality, and evaluation of the effects of stresses on the Nation's ground-water and surface-water resources.

USGS Activities Help Secure a Decrease in Louisiana Flood Insurance Rates

The USGS participated as a key team player in Louisiana's hurricane preparedness drill on June 18, 1998. Other participating agencies included the FEMA, U.S. Army COE, NWS, Louisiana Office of Emergency Preparedness, Louisiana State Police, Louisiana Department of Transportation and Development, and the Red Cross. In addition to participating in the hurricane preparedness drill, the USGS revised a previously published flood tracking chart for the Amite River Basin to include stations added to the flood-monitoring network in the basin since the original publication. The chart is available in all public libraries and Welcome Centers in the basin, and in the Governor's Office. The USGS real-time flood alert systems and the mass distribution of the flood tracking chart and associated information on flooding, as well as many other community activities, have helped secure a 15 percent decrease in flood-insurance rates for communities in flood-prone areas.

Interpretive Studies — In addition to data collection activities, the Coop Program is supporting about 500 hydrologic studies and investigations in FY 1999. Water resource appraisals define, characterize, and evaluate the extent, quality, and availability of water resources. Since the early 1970's, there has been an increase in the number of investigations that have emphasized water-quality issues, such as aquifer contamination, land application and injection of reclaimed water, river quality, storm-runoff quality, and the effects of acid rain, urbanization, mining, and agricultural chemicals and practices on water resources. These investigations result in reports published and provided to State agencies which form the basis for management of water resources by the responsible agencies.

The Nation's ability to cope with new and challenging problems in ground-water development and management rests in large measure on information from investigations conducted through the Coop Program. The matters of ground-water contamination, underground waste disposal, urban and agricultural runoff, and saltwater intrusion, for example, were recognized as issues of concern in the Coop Program long before they rose to national attention. Investigations such as these provide fundamental information on the extent and effects of contaminants in the water resources environment, and facilitate the development of plans for remedial actions.

Regional and National Synthesis—One of the defining strengths of the Coop Program is that work is conducted in all parts of the country using methods that make results of the work comparable. This unique attribute provides the ability to synthesize hydrologic information for a variety of hydrogeologic and climatic settings across the country, greatly expanding its usefulness and transferability. One of the best examples of national synthesis within the Coop Program is the National Water-Use Information Program. This Program, in cooperation with the States, collects reliable and uniform information on the sources, uses, and disposition of water in the U.S. The USGS now has a valuable long-term data set of national water-use estimates obtained from many disparate sources using uniform methods across the country. This data set can be used to assess the effectiveness of alternative water-management policies, regulations, and conservation activities, and to make projections of future demands. The Program is funded jointly in a 50-50 partnership with each State and Puerto Rico. These partnerships ensure the cost effectiveness and consistency necessary to continuously evaluate water use nationwide. The Federally appropriated portion of this Program is about $4 million in FY 1999 and is planned to remain the same in FY 2000.

Results of Bridge Scour Studies Transfer to Many Other Areas of the Country

Because of increasing national concern about the safety of highway bridges subject to scour, Departments of Transportation (DOTs) in all States have been mandated to complete scour assessments on all Federally funded highway bridges. Complete scour assessments require fairly complex hydraulic analyses that are expensive and time consuming. USGS hydrologists in Montana, in cooperation with the Montana Department of Transportation, developed a method for rapidly estimating bridge scour depth based on limited, easily measured data that could be applied to a large number of sites in a fairly short time. The method is based on a synthesis of data from similar USGS studies in 10 States. The USGS subsequently used this method to estimate scour depths at over 1,500 bridges in Montana, thereby greatly helping the Montana DOT to meet the national deadline for preliminary scour assessment. This study provided the Montana DOT with scour assessments on a timely basis that could not have been completed using conventional methods.

In 1998 the rapid-estimation method was used in other States to help State DOTs meet national deadlines and help ensure public safety and save on the cost of field work.

Every 5 years the water use data resulting from this effort are compiled, entered into a national data-base system, and published in a national circular. The 1995 compilation was released during FY 1998 and is available both online (**http://water.usgs.gov/watuse/**) and in paper copy. The report describes water use in the U.S. by major water-use categories (for example, domestic water use). For each water-use category, there is a description of where the water comes from, what the water is used for, and where is goes after use.

Another strength of the Coop Program is that work on a single topic is conducted in a variety of hydrogeologic conditions using a number of comparable methods. A national synthesis of this type enables fundamental concepts to be tested and improvements in the methodologies to be made. For example, the EPA and most States have developed "wellhead protection" programs to try to minimize contamination in the "contributing areas" of supply wells. (An area contributing recharge to wells is the location within the ground-water system that is the source

of water that eventually discharges at a supply well.) The USGS has taken an active role in studies involving the estimation of areas contributing recharge to wells, particularly public supply wells, both in providing analytical tools for such studies and in applying these tools within the context of cooperative studies in different hydrogeologic settings throughout the Nation. A resulting synthesis of this nationwide work from the Coop Program on "contributing areas" of wells is documented in a recent USGS report titled "Estimating areas contributing recharge to wells: Lessons from previous studies" (USGS Circular 1174).

By using the results of these studies on contributing areas from across the Nation under a variety of hydrogeologic conditions, some very important aspects of the problem are becoming apparent. These aspects include: (1) a better understanding of the various pathways for contaminated ground water to reach wells, (2) the significance of quantifying the three-dimensional ground-water system, (3) the effects of changing hydrologic conditions, (4) the effects of well-screen location and pumping rates, and (5) an understanding of the uncertainties in the estimation of contributing areas. The synthesis of information on one problem (i.e., contributing areas of wells) that occurs throughout the Nation under different conditions allows for a better understanding of the problem and improved methods for their determination.

Recent Accomplishments

Ground-Water Resources, Deschutes Basin — The USGS has worked in cooperation with the Oregon Water Resources Department, Deschutes and Jefferson Counties, the Confederated Tribes of the Warm Springs Reservation, and the cities of Bend, Redmond, and Sisters, on a project to evaluate the ground-water resources of the Deschutes Basin in Oregon. Data collected and computer simulations for this study have removed much uncertainty about regional ground-water/surface-water relations. Information from USGS studies has allowed State regulators to act on water-right applications in a manner that is more technically sound than methods used previously. A reassessment of ground-water policy in the basin, brought about in part by USGS project results, is presently underway by the Oregon Water Resources Department.

USGS Data Help Determine Cause of Fish Disease Outbreak in Southeast Florida — Historical flow data from two long-term stations, the Caloosahatchee Canal discharging to the west coast and St. Lucie Canal discharging to the east coast, are being used by the Florida Department of Environmental Protection (FDEP) to examine the correlation of low salinity to recent outbreaks of fish disease. Historical data from the St. Lucie Canal will be used to examine the frequency of 1998's high, El Niño related discharges and to determine if previous outbreaks of fish disease were related to periods of high flow. Historical discharges from both stations will be compared and used to determine why fish disease outbreaks are apparently confined to the east coast. Results of these analyses were presented by the FDEP staff at a town meeting in Stuart, Florida, on April 21.

Pesticides in the Willamette River Basin — In January 1998 the USGS released a report describing Phase III of the Willamette River Basin Water Quality Study, a cooperative study with the Oregon Department of Environmental Quality (DEQ). The report describes pesticide concentrations and other water-quality considerations in small watersheds in the Willamette

Basin that have intensive upstream agricultural or urban land uses. Streams in these watersheds have somewhat higher pesticide concentrations, and more exceedances of water-quality criteria for bacteria and temperature, than larger streams studied previously. The report has had an impact on State decision making because the DEQ is required to list water-quality-limited streams under the Clean Water Act and has, until now, focused on larger streams in the basin that typically have more data.

Cooperator Interest

In FY 1999, more than 1,200 cooperators are participating in the Coop Program. These cooperators include State, county, and municipal agencies, as well as interstate compact organizations, conservation districts, water-management districts, drainage and flood-control districts, Native American Tribes, and other similar organizations. In FY 1998, cooperators provided $99.2 million, which exceeded the available amount of Federal matching funds by $33 million (see Figure W-7, page 205). State and local cooperators routinely contribute more funds to the Coop Program than can be matched by Federal appropriations. This is compelling evidence of the cooperators' strong support of the Program, as well as a testament to the USGS's ability to consistently meet its customers' needs.

Stream Bank Erosion — During 3 years of investigating stream bank erosion in cooperation with the Alaska Department of Fish and Game, the Alaska Department of Environmental Conservation, and the Lake and Peninsula Borough, USGS hydrologists discovered that, during years when streamflow is below normal, as much as 97 percent of annual bank erosion is caused by boat wakes. In addition, areas of rivers that do not typically experience significant erosion, such as the inside of meander bends, have been undercut more than 4 feet during a single season of boat traffic. Even remote rivers with low numbers of boats, such as the Alagnak River in southwestern Alaska, experience substantial stream bank erosion induced by boat wakes. Accelerated bank erosion may degrade important habitat and threaten Alaska's economically valuable salmon resources. The results of the studies will be used to manage recreational activities on rivers in Alaska.

Microbiological Quality of Public Water Supplies — In cooperation with the Missouri Department of Natural Resources, Public Drinking Water Program, the USGS sampled 109 public water supply wells in 1997 and again in 1998 to characterize the microbial activity of ground water in the Ozark Plateaus region. Much is known about bacterial contamination, but little is known about viral contamination and its relation to the bacterial and chemical characteristics of the ground water. Results of this study will provide State regulatory agencies with data needed to make informed decisions on treatment of potable ground-water supplies in the Ozark Plateaus and will provide useful and timely input to the EPA for establishing ground-water disinfection rules for this type of carbonate aquifer system. Preliminary results indicate that microbiological contamination of public water supply wells in the Ozark Plateaus is not widespread. A USGS Fact Sheet describing the cooperative study and presenting the results of the first round of sampling is available on the USGS Missouri District home page at **http://wwwdmorll.er.usgs.gov/**.

Well Field Protection, Indiana — Ground water beneath an Indiana Department of Transportation (INDOT) maintenance facility in Proter County, Indiana, near the City of Valparaiso has become contaminated with salt from the storage and handling of highway deicing salts. This contamination threatens the City of Valparaiso well field. Geophysical logging done by the USGS in cooperation with the INDOT has helped to delineate the area of

contamination at cost much lower than traditional ground-water sampling methods. This information is being used by the INDOT to design mitigation actions to protect the quality of the Valpariso public water-supply wells.

USGS and Cooperator Funding for Federal-State Cooperative Water Program in FY 1998

State	USGS Funding	Cooperator Funding	State	USGS Funding	Cooperator Funding
Alabama	$ 880	$ 880	Nebraska	$ 790	$ 1,018
Alaska	1,058	1,394	Nevada	1,925	2,419
Arizona	1,239	2,300	NH/Vermont	591	1,179
Arkansas	819	1,305	New Jersey	2,160	3,157
California	4,265	7,943	New Mexico	1,627	2,485
Colorado	2,186	2,601	New York	2,495	5,138
Connecticut	587	1,006	North Carolina	1,735	2,362
Florida	5,441	8,195	North Dakota	758	758
Georgia	1,630	3,264	Ohio	1,132	1,740
Hawaii	1,220	2,298	Oklahoma	1,066	1,149
Idaho	1,243	1,738	Oregon	1,376	1,420
Illinois	1,047	1,413	Pennsylvania	1,605	4,486
Indiana	986	1,649	South Carolina	1,370	1,392
Iowa	881	941	South Dakota	1,167	1,198
Kansas	1,244	1,621	Tennessee	870	870
Kentucky	922	947	Texas	3,009	5,315
Louisiana	1,223	1,446	Utah	1,263	1,382
Maine	405	472	Virginia	737	1,201
MD/DE/DC	1,203	1,824	Washington	1,457	1,756
MA/RI	1,298	1,937	West Virginia	500	500
Michigan	829	1,361	Wisconsin	1,608	2,004
Minnesota	1,161	1,262	Wyoming	768	768
Mississippi	1,000	1,342	Puerto Rico	1,570	3,386
Missouri	863	2,058			
Montana	1,022	1,022	Total	$66,231	$99,302

Projections for FY 1999 and FY 2000

	FY 1999	FY 2000
USGS Funds	$ 70,137	$ 58,356
Cooperator Funds	$102,137	TBD
Cooperator Funds in Excess of USGS Funds	$ 32,000	TBD

Figure W-7

Justification for Program Change

In consultation with the States, USGS will determine those water quality monitoring and assessment activities that need to continue and those that can be terminated.

	FY 2000 Request	Program Change
$(000)	58,356	-2,500