

T H E
U.S. GEOLOGICAL SURVEY
FEDERAL-STATE COOPERATIVE
WATER - RESOURCES
PROGRAM

FISCAL YEAR 1992

by B.K. Gilbert and W.B. Mann IV

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THE U.S. GEOLOGICAL SURVEY FEDERAL-STATE
COOPERATIVE WATER-RESOURCES PROGRAM
FISCAL YEAR 1992

by Bruce K. Gilbert and William B. Mann IV

ABSTRACT

The Federal-State Cooperative Program is a major U.S. Geological Survey activity for the collection, analysis, and reporting of information on the quantity, quality, and use of the Nation's water resources. The fundamental characteristic of the program is that most of the work is undertaken by the U.S. Geological Survey through joint-funding agreements, with State, regional, and local agencies providing at least one-half the funds. The main objectives of the program are (1) to collect, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources; and (2) to appraise the availability and the physical, chemical, and biological characteristics of surface and ground water through data analysis and interpretive water-resources investigations and research. During fiscal year 1992, Cooperative Program activities were underway in offices in every State, Puerto Rico, and several territories in concert with more than 1,000 cooperating agencies. In fiscal year 1992, Federal funding of almost \$63 million was matched by cooperating agencies, which also provided almost \$21 million unmatched for a total program of about \$147 million. This amounted to nearly 42 percent of the total funds for the U.S. Geological Survey's water-resources activities.

This report presents examples of current (1992) investigations, as well as updated information on hydrologic data-collection operations. Information also is provided with respect to activities in the Cooperative Program that are related to the National Water-Quality Assessment Program.

INTRODUCTION

Federal, State, regional, and local agencies share keen interests in appraising the Nation's water resources and in seeking solutions to water-related problems. Because of a variety of missions and areas of responsibility, agencies at times have diverse perceptions of need, priorities, and approaches. One of the principal strengths of the U.S. Geological Survey's (USGS) Federal-State Cooperative Program is that this diversity can be accommodated through joint planning and funding of hydrologic data collection, investigations, and research.

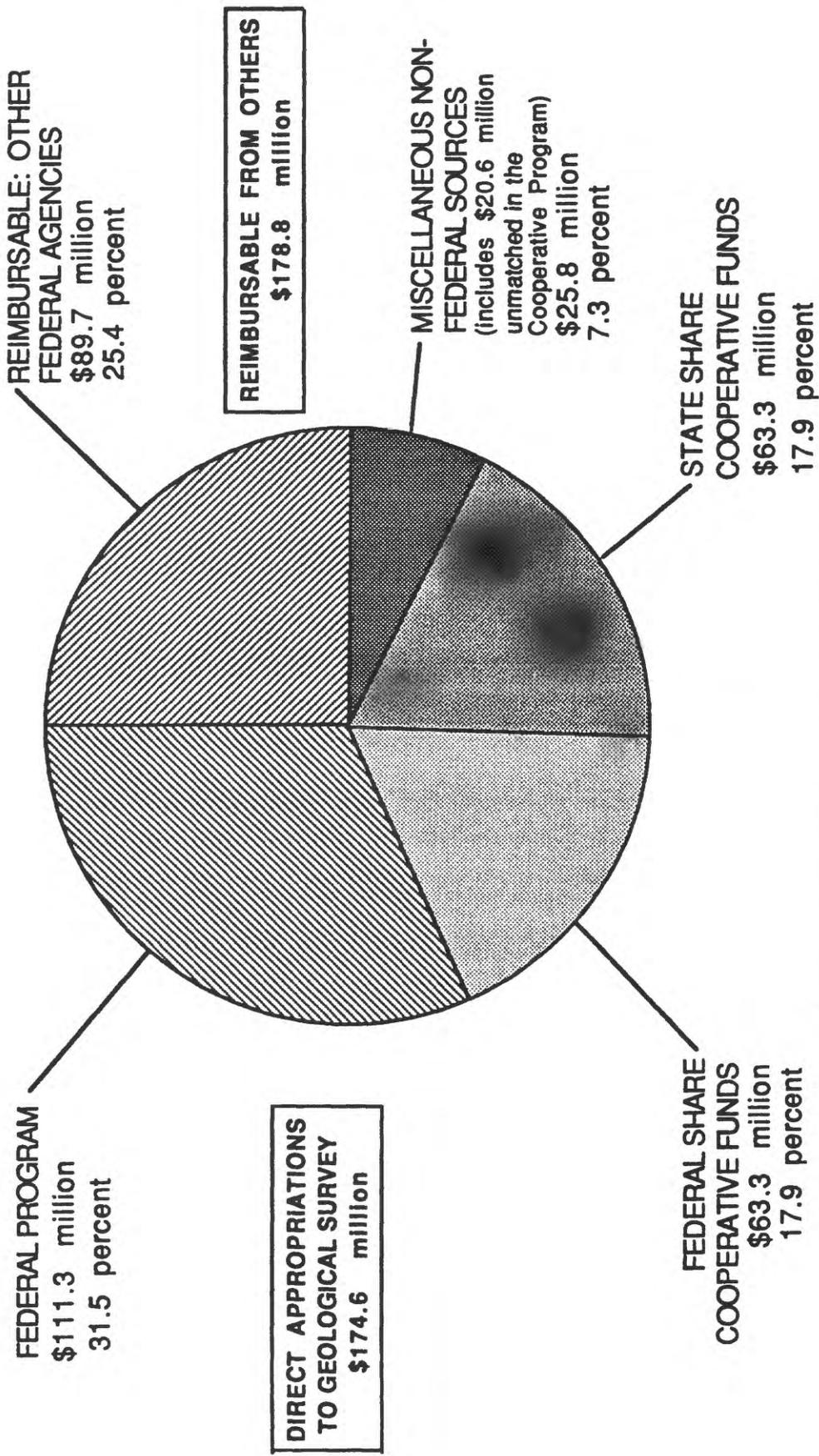
The Cooperative Program, a partnership between the USGS and State and local agencies, provides a balanced approach to water-resources investigations. It is a major part of the USGS's coordinated program of water-resources investigations and research. The principal program objectives are (1) to collect, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of water resources in the United States; and (2) to appraise the availability and the physical, chemical, and biological characteristics of surface and ground water through data analysis and interpretive water-resources investigations and research. The resulting information forms the foundation for many of the Nation's water-resources management and planning activities. In addition, the information can help identify emerging water problems at an early stage.

The Cooperative Program has contributed directly to water-resources knowledge for almost 100 years by fostering a working partnership between the Federal and State governments in the advancement of earth science, and by compiling a major part of the Nation's hydrologic information. From its earliest days, the program has been responsible directly for the development of procedures for streamgaging, concepts of surface-water and ground-water flow, and analytical techniques for investigations of water quality.

The first USGS cooperative water-resources investigation was with the State of Kansas in 1895. In 1905, Congress appropriated funds specifically for cooperative studies, marking the official beginning of the program. In 1928, Congress gave formal recognition to the Federal-State partnership and limited the Federal financial contribution for cooperative water-resources studies to no more than 50 percent of the total funds for each investigation.

During fiscal year (FY) 1992, hydrologic data collection, interpretive investigations, and research were conducted under the provisions of the Cooperative Program by USGS Water Resources Division personnel in offices in every State, in Puerto Rico, and in several territories in concert with more than 1,000 cooperating agencies (see appendix A). The locations of principal Water Resources Division offices are shown in figure 1. State, county, and municipal agencies participate in the program, as do interstate-compact organizations, State universities, conservation districts, sanitary districts, drainage districts, flood-control districts, and other similar organizations. In FY 1992, Federal funding of more than \$63 million was matched by cooperating agencies, which also provided almost \$21 million unmatched, for a total of about \$147 million. This total constituted nearly 42 percent of the total funds for the USGS's program of water-resources activities (figure 2).

The fundamental characteristic of the Federal-State Cooperative Program is that local and State agencies provide at least one-half the funds, but the USGS does most of the work. At times, the cooperator's contribution to the program may be partly in the form of



FY 1992 TOTAL \$353.4 MILLION

Figure 2 - Actual obligations of the U.S. Geological Survey Water Resources Division, fiscal year 1992

support known as direct expenditures, rather than funds. This refers to mutually agreed-upon work or material contributions for which dollar-value credit is given by the USGS for services rendered by the cooperator in support of program objectives.

FUNCTIONS OF THE COOPERATIVE PROGRAM

In fulfilling its water-resources mission, the USGS performs four principal functions:

- It collects data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources.
- It conducts analytical and interpretive appraisals to describe the occurrence, availability, and physical, chemical, and biological characteristics of surface and ground water.
- It conducts research in hydraulics, hydrology, and related scientific and engineering fields.
- It disseminates water data and the results of investigations and research.

The collection of surface-water and ground-water data on a systematic basis under the provisions of the Federal-State Cooperative Program is a major part of the USGS's coordinated water-resources activities. The resulting information provides a continuing record of the quantity, quality, and use of the Nation's water resources. In FY 1992, the Federal-State Cooperative Program served as the sole source of funding for the operation of more than 4,000 continuous streamflow stations and partially funded an additional 700 continuous streamflow stations. These stations constitute almost 65 percent of the continuous streamflow stations operated by the USGS. The program also provided funds for the collection of ground-water levels at approximately 26,000 wells and the collection of water-quality data at about 2,600 surface-water stations and 6,200 ground-water well and spring stations. These data provide information necessary for the determination of water suitability for various uses, identification of trends, and evaluation of the effects of stresses on the Nation's surface- and ground-water resources. Additional information on this topic is provided in the section of this report entitled "Hydrologic Data Collection".

Within the Cooperative Program, typically about half of the funds support the collection of hydrologic data; the remaining half support hydrologic investigations and research. During FY 1992, the USGS was involved in about 500 research projects and investigations as part of the Cooperative Program. Investigations encompass areas that range in size from a square mile or less to multistate regions. In these investigations, USGS scientists bring together information to define, characterize, and evaluate the areal extent, quality, and availability of the water resource. 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, river quality, storm runoff quality, and the effects of acid rain, coal mining, and agricultural chemicals and practices on the hydrologic system.

In 1977, the Congress of the United States recognized the need for uniform, current, and reliable information on water use and directed the USGS to establish a National Water-Use Information Program to complement the Survey's data on the availability and quality of the Nation's water resources. Thus, the National Water-Use Information Program became part of the USGS's Federal-State Cooperative Program (Mann and others, 1982). As of 1992, all 50 States and Puerto Rico participate in the program at various levels of involvement.

All data and results of analytical studies are made available to cooperating agencies and to the public through published reports (about 1,500 in FY 1992), and through

computerized information programs, such as the National Water Information System (NWIS) and the National Water Data Exchange (NAWDEX) Program. Abstracts of completed reports are made available through the USGS Water Resources Scientific Information Center (WRSIC). Hydrologic data can be accessed by computer terminals at offices in every State.

In many places, the Cooperative Program provides the only source of support for water-data collection and investigations required to assess, on a continuing basis, the status of the Nation's water resources. Information developed in the Cooperative Program has relevance to potential and emerging long-term problems, such as water supply, waste disposal, energy development, and environmental management and protection. Because common analytical methods and techniques are used, the information also is relevant to problems having interstate, regional, national, or international significance. The information furnishes the basis required to abide by interstate and international compacts and Federal law and court decrees, and to carry out congressionally mandated studies, regional and national water-resources assessments, and planning activities.

PROGRAM PRIORITIES

Program priorities are based on national needs that have been identified by the President and Administration advisors, by the Congress, by the Department of the Interior, by other Federal agencies, and from information the USGS has received from cooperating agencies and other interested parties. Issues that are identified through the National Water Summary (U.S. Geological Survey, 1984, 1985, 1986, 1988, 1990, and 1991) also are taken into consideration. As a result, the priorities are developed in response to mutual Federal, regional, State, and local requirements.

Thus, the USGS and its cooperating agencies work together in a continuing process that leads to adjustments in the program each year. The number of requests for scientific and technical assistance continues to grow from State agencies responsible for ground-water protection and for controlling and mitigating contamination. State offerings typically exceed Federal matching funds by as much as \$20 million or more each year (almost \$22 million in FY 1992) and reflect the increasing emphasis on water-quality issues, as well as other concerns regarding the availability, distribution, and use of the resource.

The strong linkage between the Cooperative Program, the Federal Program, and the Other Federal Agency Program is clearly reflected in the issues identified for FY 1993. The National Water-Quality Assessment (NAWQA) Federal Program, for example, will continue to build on water-quality information developed over many decades within the Cooperative Program. In turn, cooperative interests already are developing because of the new information emerging in the pilot NAWQA Program studies, as described in a subsequent section of this report entitled "Activities Related to the National Water-Quality Assessment Program." Data collection supported by the Federal Program and by other Federal agencies provides additional information. Ground-water contamination studies funded by military and civilian Federal agencies are providing valuable hydrologic information and research in basic physical processes. The USGS's National Research Program helps develop and refine hydrologic principles and methods for use in the Federal-State Cooperative Program. These are but a few examples of the interdependence among programs.

The following topics have been identified as highest priority in developing the FY 1993 Cooperative Program:

GROUND-WATER QUALITY--Concern continues over the vulnerability of the Nation's ground water to waste-disposal activities, nonpoint-source contamination, and saltwater intrusion. Of special concern are contamination sources related to agriculture. Further investigation of natural processes, such as flow dynamics, solute-transport and geochemical reactions, and the effects of subsurface biota that can alter, add, or remove contaminants, is needed in addition to studies of the effects of human activities. In some areas, improved definition of current ground-water quality is needed as a baseline for evaluation of future changes.

WATER SUPPLY AND DEMAND--The future health and economic welfare of the Nation's population depend on a continuing supply of uncontaminated fresh water. Increasing withdrawals and diversions of water for an ever-growing variety of users stress the quantity and quality of existing supplies. Recent drought in many areas of the country has accentuated the need to seek additional water supplies and to gather new information. Improved water-use information is needed to quantify the stresses on existing supplies and to refine possible demand-management options to supplement the traditional supply options. Improved flow-system definition and simulation also are

needed to manage aquifers that serve as important local or regional sources of water supply.

STREAM QUALITY--Assessment of the quality of the Nation's streams continues to be a priority component of the Cooperative Program. Improved information is needed on stream quality and sediment chemistry as related to land use, stream biota, ground-water contributions, and overland runoff. The effects of contamination from agricultural and urbanized areas on stream quality are issues of special national concern.

WETLANDS, LAKES, AND ESTUARIES--These valuable ecosystems merit special attention because of their importance as fish and wildlife habitat, sources of water supply, and recreational areas. Although these areas are particularly sensitive to the effects of human activities, they continue to be subject to development pressures. An improved understanding of the physical, chemical, and biological processes is needed to manage and protect these valuable resources.

HYDROLOGIC HAZARDS--Economic losses from floods, lake-level changes, mud and debris flows, erosion and sedimentation, and other hydrologic hazards can amount to billions of dollars annually. Studies are needed to improve the understanding of processes underlying these events and the likely magnitudes and effects of hydrologic hazards. Studies involving the use of newly available precipitation data from the National Weather Service Next Generation Radar to improve flood modeling and estimating are encouraged.

NONPOINT-SOURCE POLLUTION--Nonpoint-source pollution is the by-product of a variety of land use factors ranging from urbanization to cultivation for agriculture. The types and extent of nonpoint-source contamination as well as the effectiveness of potential solutions to contamination are poorly understood. Technical information is needed to conduct effective monitoring programs and to identify effective management practices.

HYDROLOGIC DATA COLLECTION--The hydrologic data program of the USGS continues to be the foundation for present and future interpretive studies. Large amounts of data and specialized interpretation are required to resolve conflicts among State and Federal agencies regarding Federal reserved water rights, particularly Indian water rights. The NAWQA Program and other USGS initiatives will rely heavily on past, present, and future data-collection efforts.

INDIAN WATER RIGHTS--The USGS has long assisted in appraising the water resources of Indian lands as part of the Cooperative Program. The protection and management of the Indian tribes' natural resources are essential elements of the Secretary of the Interior's trust responsibility to the tribes. Priorities in the Cooperative Program will continue to emphasize hydrologic data collection and investigations in this regard.

HYDROLOGIC DATA COLLECTION

The collection of surface-water and ground-water data on a systematic basis through the Federal-State Cooperative Program is a major part of the USGS's coordinated water-resources activities. Table 1 summarizes the numbers of stations operated through funding from the Federal, Cooperative, and Other Federal Agency Programs. The resulting information provides a continuing record of the quantity, quality, and use of the Nation's water resources. The data are available for use by Federal, State, and local agencies in developing, utilizing, conserving, and managing water and related land resources to meet the Nation's need for clean water. The data are also the basis for continuing analytical, interpretive, and predictive studies and appraisals of water resources. The number of continuous and scheduled long-term surface-water, ground-water, and water-quality stations operated by the USGS in FY 1992 are shown by sources of support in figure 3.

In FY 1992, the Federal-State Cooperative Program funded totally the operation of 4,048 continuous stream discharge stations (table 1) and funded in combination with other sources another 675 continuous stream discharge stations. Virtually all the stations serve several purposes. In addition to meeting State and local needs, for example, the Federal-State Cooperative Program stations provide information required by many Federal agencies--for flood prediction, land-use planning, streamflow regulation, hydroelectric power production, waste disposal standards, pollution regulation, highway and bridge structure design, coal mine permits, and land reclamation. Specifically, about 3,000 stations are currently used by the National Weather Service for flood and flow forecasting.

The program funded fully or in part the collection of ground-water levels at 22,058 scheduled, long-term sites and 3,574 short-term or project sites, as shown in table 2. Each year from 1988 through 1992, the Cooperative Program supported data collection at between 25,600 and 29,900 public and privately owned wells (long-term and short-term sites) where information was collected on ground-water levels. Water-level data are used to assess changes in ground-water storage that can result from natural causes or from man's activities. These data are necessary to determine suitability of water for various uses, to identify trends, and to evaluate the effects of stresses on aquifers. Overall in FY 1992, the Cooperative Program accounted for more than 80 percent of the USGS's activities in ground-water data collection.

The FY 1992 program also provided for collection of water-quality data at a total of 2,577 surface-water stations and a total of 6,231 ground-water stations. From 1988 through 1992, selected water-quality constituents were determined annually from samples collected at 5,400 to 6,400 wells.

The Program has been adjusted at times in response to changing requirements for hydrologic data, as reflected in the summary information of table 2. For example, from fiscal year 1988 to 1992, the number of continuous surface-water discharge stations declined by 208 sites; the total number of surface-water quality stations increased by 615; total ground-water level stations declined by 3,687; and total ground-water quality stations decreased by 118. These changes have been produced by the need to adapt program content to the availability of funds and evolving priorities, and are composites of increases in some States and decreases in others.

The use of satellite-telemetry technology continues to increase to meet needs for near real-time hydrologic data for flood-forecasting and water-management purposes, and for monitoring the operation of critical data-collection stations. As of FY 1992, largely

Table 1--Water-data collection activities of the
U.S. Geological Survey, fiscal year 1992

| Types of Stations ¹ | Number of Stations ² | | | | |
|---|---------------------------------|--------------------------------------|---------------------------------|---------------------|--------|
| | A. Federal Program | B. Federal-State Cooperative Program | C. Other Federal Agency Program | D. Combined Support | Total |
| SURFACE WATER | | | | | |
| <u>Discharge</u> | | | | | |
| Continuous Record | 531 | 4,048 | 1,889 | 825 | 7,293 |
| Partial Record | 132 | 2,451 | 369 | 47 | 2,999 |
| <u>Stage only--Streams</u> | | | | | |
| Continuous Record | 13 | 239 | 311 | 47 | 610 |
| Partial Record | 9 | 264 | 56 | 18 | 347 |
| <u>Stage only--Lakes and Reservoirs</u> | | | | | |
| Continuous Record | 14 | 392 | 389 | 24 | 819 |
| Partial Record | 11 | 296 | 76 | 15 | 398 |
| <u>Quality</u> | | | | | |
| Scheduled, Long-Term | 432 | 1,449 | 346 | 111 | 2,338 |
| Short-Term or Project | 143 | 961 | 184 | 80 | 1,368 |
| GROUND WATER | | | | | |
| <u>Water Levels</u> | | | | | |
| Scheduled, Long-Term | 2,162 | 21,648 | 1,021 | 410 | 25,241 |
| Short-Term or Project | 555 | 3,255 | 1,669 | 319 | 5,798 |
| <u>Quality</u> | | | | | |
| Scheduled, Long-Term | 253 | 3,846 | 175 | 162 | 4,436 |
| Short-Term or Project | 448 | 1,990 | 634 | 233 | 3,305 |

¹ Types of Stations

CONTINUOUS RECORD: The station is instrumented to monitor hydrologic conditions continually and, in some instances, to transmit data soon after collection.

PARTIAL RECORD: Hydrologic information is collected only during selected periods, for example, during floods.

SCHEDULED, LONG-TERM: Hydrologic information is collected on a fixed schedule for a long period to detect trends. With respect to surface-water quality and ground-water levels, continuous-recording stations are included in this category.

SHORT-TERM OR PROJECT: Hydrologic information is collected to meet the needs of a specific study. Data supplement those available from scheduled, long-term; continuous-record; and partial-record stations.

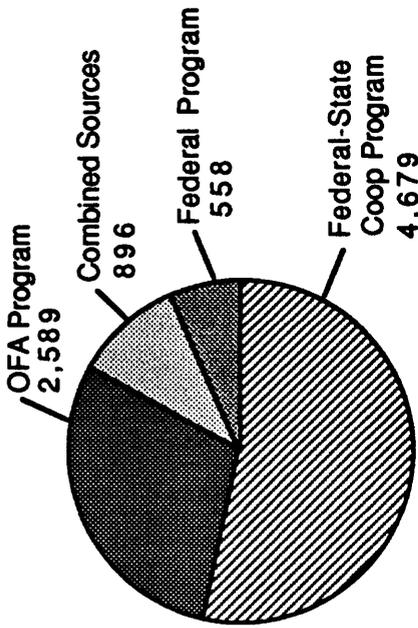
² Number of Stations

COLUMN A--Stations totally supported by funds appropriated to the USGS for the Federal Program.

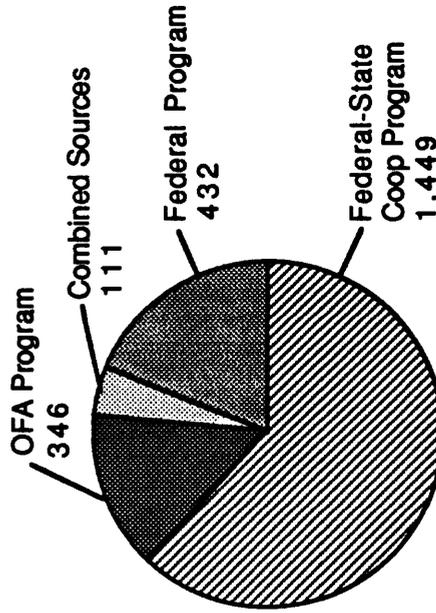
COLUMN B--Stations partly supported by funds appropriated to the USGS for the Federal-State Cooperative Program.

COLUMN C--Stations totally supported by reimbursements as part of the Other Federal Agency Program.

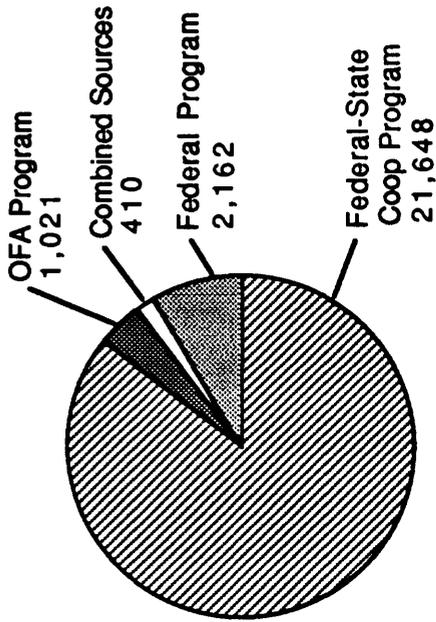
COLUMN D--Stations supported by a combination of two or more of the above.



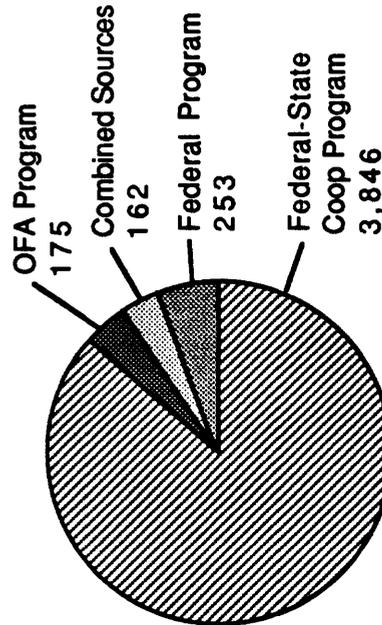
STREAM DISCHARGE: STREAM, LAKE AND RESERVOIR STAGE--8,722



SURFACE-WATER QUALITY--2,338



GROUND-WATER LEVELS--25,241



GROUND-WATER QUALITY--4,436

Figure 3 - Number of continuous and scheduled, long-term surface-water, ground-water, and water-quality stations, by sources of support, that were operated by the U.S. Geological Survey in fiscal year 1992. The sources of support include the Federal-State Cooperative Program, the Federal Program, and the Other Federal Agency (OFA) Program.

Table 2--Water-data collection stations supported fully or in part by the
U.S. Geological Survey Federal-State Cooperative Program,
fiscal years 1988 through 1992

| Types of Stations ¹ | Fiscal Year | | | | |
|---|-------------|--------|--------|--------|--------|
| | 1988 | 1989 | 1990 | 1991 | 1992 |
| SURFACE WATER | | | | | |
| <u>Discharge</u> | | | | | |
| Continuous record | 4,931 | 4,691 | 4,840 | 4,813 | 4,723 |
| Partial record | 3,393 | 3,073 | 3,051 | 2,739 | 2,476 |
| <u>Stage only--Streams</u> | | | | | |
| Continuous record | 244 | 259 | 236 | 292 | 279 |
| Partial record | 206 | 260 | 300 | 352 | 281 |
| <u>Stage only--Lakes & Reservoirs</u> | | | | | |
| Continuous record | 423 | 426 | 441 | 420 | 416 |
| Partial record | 236 | 255 | 243 | 227 | 310 |
| <u>Quality</u> | | | | | |
| Scheduled, long-term | 1,344 | 1,430 | 1,454 | 1,583 | 1,536 |
| Short-term or project | 618 | 900 | 745 | 622 | 1,041 |
| GROUND WATER | | | | | |
| <u>Water Levels</u> | | | | | |
| Scheduled, long-term | 21,801 | 22,997 | 22,123 | 22,381 | 22,058 |
| Short-term or project | 7,518 | 6,681 | 7,825 | 5,624 | 3,574 |
| <u>Quality</u> | | | | | |
| Scheduled, long-term | 3,257 | 3,870 | 3,802 | 3,775 | 4,008 |
| Short-term or project | 3,092 | 2,552 | 2,607 | 2,619 | 2,223 |

¹ Types of Stations

CONTINUOUS RECORD: The station is instrumented to monitor hydrologic conditions continually and, in some instances, to transmit data soon after collection.

PARTIAL RECORD: Hydrologic information is collected only during selected periods, for example, during floods.

SCHEDULED, LONG-TERM: Hydrologic information is collected on a fixed schedule for a long period to detect trends. With respect to surface-water quality and ground-water levels, continuous-recording stations are included in this category.

SHORT-TERM OR PROJECT: Hydrologic information is collected to meet the needs of a specific study. Data supplement those available from scheduled, long-term; continuous-record; and partial-record stations.

through reimbursements from other Federal, State, and local agencies, satellite data-relay platforms have been installed in about 3,500 USGS stations and are providing information variously on stream discharge, stream or reservoir stage, selected water-quality characteristics, or precipitation quantity. About 2,700 of the platforms are operated by the USGS and the remaining 800 are operated by others. More than one-quarter of the platforms receive support from the Federal-State Cooperative Program and approximately two-thirds of the funding is derived from other Federal agencies. It is anticipated that by FY 1994, satellite data-relay platforms will be in operation at as many as 4,200 USGS stations.

ACTIVITIES RELATED TO THE NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

The USGS National Water-Quality Assessment (NAWQA) Program is designed to describe status and trends in the quality of the Nation's surface-water and ground-water resources (Leahy and others, 1990). The program, fully funded by Federal appropriations, also will provide an improved understanding of the natural and human factors that affect the quality of these resources. Water-quality information will be integrated at different spatial scales, such as, local, study-unit, regional, and national, to achieve program objectives. In addition, the program will address those water-quality conditions that affect large areas or recur at the local scale.

The program includes 60 study-unit investigations of areas located throughout the Nation that provide a framework for an aggregation of findings on regional and national scales. Collectively, the study units encompass an area which accounts for 60 to 70 percent of the total ground-water and surface-water use and population served by public water supply systems.

In 1986, the NAWQA Program pilot studies were started in seven areas. The program was well received and in late 1989 the Administration requested that Congress fund the transition to a full-scale NAWQA Program. Congress appropriated \$18 million in FY 1991.

As a result of the positive reactions to the planned program, the pilot studies, and the appropriation by Congress in the FY 1991 budget to begin the full program, interest surfaced for enhancing the NAWQA Program with investigations in the Cooperative Program. The companion studies are providing additional knowledge and information that might not have been available otherwise. The number of these Cooperative Program studies and their complexity continue to increase.

The following are examples of the types of NAWQA-related studies conducted as part of the Cooperative Program.

- **Kansas: Degradation of Atrazine in Ground Water**
A cooperative project between the USGS and Kansas State University has been initiated at a farm plot scale to: (1) determine the degradation rates of the atrazine herbicide in ground-water systems; (2) determine whether the principal degradation pathways are chemical or microbiological; (3) determine, to the extent possible, the principal degradation products of atrazine in ground water; and (4) conduct a parallel study of the degradation of atrazine in unsaturated soil environments. This information is necessary to understand the transport, persistence, and long-term effects of atrazine in ground-water systems.
- **Kansas: Pesticide Movement in Surface and Ground Water**
A cooperative project among the USGS, the Kansas State Board of Agriculture, and Kansas State University is designed to determine the potential to decrease the transport of herbicides, such as atrazine and other organo-nitrogen herbicides, into surface and ground water. Specific objectives are to: (1) measure atrazine, alachlor, and their selected metabolites and suspended-sediment concentrations in surface runoff under different land-management practices, such as terraced, clean-tilled, and ridge-tilled cornfields with and without grassed filter strips; and (2) evaluate the difference in infiltration volume and soil-water quality among the different land-management practices.

- **Arkansas: Flow Systems in Carbonate-Rock Aquifers**

On local and regional scales, flow systems and solute transport mechanisms are poorly defined for most carbonate aquifers. A cooperative study among the USGS, the Arkansas Soil and Water Conservation Commission, and the University of Arkansas is designed to develop a more complete understanding of the processes and controls that affect the flow distribution and permeability in carbonate aquifers in a 16-county area of northern Arkansas. Investigators will refine existing conceptual-flow models and develop appropriate tools to quantitatively assess ground-water resources and contaminant-transport potential in carbonate rock terrains at scales ranging from regional to site specific. Wells, springs, and surface-karst features will be inventoried and selectively sampled to address transport mechanisms involving both point- and nonpoint-source contaminants using a multidisciplinary approach.

- **Colorado: Ground-Water Discharge to the South Platte River**

Concentrations of dissolved oxygen in some parts of the South Platte River between Denver and Ft. Lupton fall below regulatory limits. Effluent discharge has been identified as an important factor in dissolved oxygen depletion but other processes also contribute to low dissolved oxygen conditions. Preliminary findings indicate that ground-water discharge is a significant source of water to the river during low-flow periods. This ground-water is depleted in dissolved oxygen and nitrate relative to surface water, and thus may have a significant adverse impact on the surface-water quality. Objectives of the cooperative study between the USGS and the Metropolitan Wastewater Reclamation District include providing direct measurement of the quantity and quality of ground-water discharging to the river, identifying chemical and biological processes in streambed sediments that affect the chemistry of ground water discharging to the river, and measuring the rates of microbial nitrification and aerobic respiration in the South Platte River bed sediments.

- **Delaware: Herbicides in Shallow Ground Water**

Several herbicides commonly used on corn and soybean crops were detected in shallow ground water at two agricultural sites in Delaware as part of a cooperative study with the Delaware Geological Survey from 1988 to 1991. Atrazine was detected most frequently and commonly at higher concentrations than cyanazine, simazine, metolachlor, and alachlor. Concentrations of herbicides were below the health limits set by the U.S. Environmental Protection Agency, with the exception of one detection of atrazine and one of alachlor. Highest concentrations of herbicides were measured near the water-table surface beneath areas of intense agricultural land use. Herbicides were not detected in deeper, down gradient parts of the flow systems, although nitrate concentrations remained high.

- **Illinois: Sedimentation of the Kankakee River**

Sedimentation in the Kankakee River has been a major concern to Illinois residents for many years. Early studies showed that extensive drainage of the wetlands and channelization of the Kankakee River caused increased sedimentation, but, by the early 1950's, the river had reached equilibrium and further sedimentation was not observed. Illinois residents, however, who use the river continue to be concerned about whether or not sedimentation has continued to increase. As a result of this concern, the USGS, in cooperation with the Kankakee Soil and Water Conservation District, began a study to (1) determine the long-term sedimentation rate in the flood plain and compare rates in channelized and natural reaches of the river, (2) determine changes in channel geometry and volume over the past 30 years from the dam at Kankakee to the State line, and (3) determine a suspended-sediment budget for the central portion of the Kankakee River basin.

- **Kentucky: Effects of Oil Production on Water Resources in the Kentucky River Basin**

An area of intensive oil-production activity in the Kentucky River basin has been investigated by the USGS in cooperation with the Kentucky Geological Survey to describe the chemical character of ground and surface water, and to assess the effects of brine discharges on receiving waters. About 10 barrels of saline water are produced with each barrel of oil; the saline water is either reinjected to enhance oil recovery or discharged to the land surface. Ground-water samples obtained in oil-production watersheds indicated that (1) shallow ground water in valley alluvium probably has not been widely affected, and (2) secondary recovery of oil by water flooding had decreased the dissolved-solids concentration of water in the oil-bearing formations but not in the overlying formations.

- **Minnesota: Recharge to Aquifers in the Southern Red River Valley**

Water levels in buried sand and gravel aquifers have declined as much as 50 feet near Wahpeton, North Dakota, and Breckenridge, Minnesota, and 30 feet near Moorhead, Minnesota, as a result of ground-water withdrawals for these cities. This has caused concern about future availability of good-quality ground water. Some of the recharge to the aquifers near Wahpeton and Breckenridge could come from saline ground water in a deeper Dakota Sandstone aquifer. Both aquifers receive some recharge from infiltration through chemically-treated cropland or feedlots. The USGS in cooperation with the Minnesota Department of Natural Resources is delineating boundaries for these aquifers and will estimate relative amounts of recharge from shallow and deeper sources that could degrade the water supplies. The results of this study will help water-resource managers to better plan ground-water resource development, particularly across State boundaries.

- **Oregon: Water Quality in the Willamette River Basin**

The Oregon Department of Environmental Quality (ODEQ) must renew point-source permits in the Willamette River basin in 1994, and they need improved water-quality information to support the renewals. The ODEQ asked the USGS to cooperate in a water-quality study that will provide information on streamflow, sediment transport, and hydrophobic and hydrophilic contaminants (both metallic and organic) in water and bed sediment. Objectives of the study are: (1) to better characterize low-flow conditions and simulate streamflows in the main stem and major tributaries of the Willamette River by calibrating and verifying hydrologic (rainfall-runoff) and hydraulic (channel routing) models, (2) to measure suspended-sediment concentration and calculate loads and yields for nine locations below existing dams and compare these to pre-dam conditions, and (3) to perform reconnaissance-level water-quality sampling for organic contaminants and trace elements.

- **Virginia: Quality of Ground-Water Discharge**

The effects of nitrate in ground water, discharging to estuaries and their tributaries, on the aquatic organisms in the estuaries is a major concern in the Mid-Atlantic States. The USGS in cooperation with the Accomack-Northampton Planning District Commission and the Virginia State Water Control Board, is studying the effects of different geohydrologic environments on the quality of ground-water discharge. The study emphasizes the effects that differences in geology, topography, and vegetation have on ground-water flow, geochemistry, and nitrate concentrations.

EXAMPLES OF CURRENT INVESTIGATIONS

Several additional examples of recent cooperative investigations follow:

- **California: Ground-Water Quality in an Artificial Recharge Basin**
In southern California, 240,000 acre-feet per year of the locally supplied water comes from reclaimed water, with 183,000 acre-feet per year being used to recharge local ground-water basins. The USGS, in cooperation with the Water Replenishment District of Southern California, is studying how this reclaimed water affects ground-water quality. Reclaimed water commonly has elevated nitrogen-species concentrations, a variety of organic compounds, and suspended colloidal material, including bacteria and viruses. The objectives of the investigation include determining the amount of denitrification and total organic carbon removal that occurs, determining the occurrence of physical or biogeochemical transformations of the organic compounds, and determining the fates of colloidal materials as water percolates through the unsaturated zone to the water table.
- **Georgia: Potential for Contamination of a Limestone Aquifer**
The sinks, caves, solution channels, and cavities of limestone aquifers in karst terranes result in complex ground-water flow paths. This makes evaluation of the potential for contamination of ground water difficult in such settings. Tracers of ground-water flow, such as tritium and other environmental isotopes, have proven inadequate in some karst areas. The USGS, in cooperation with the city of Valdosta, is investigating the use of chlorofluorocarbons as a tracer of ground-water flow in south-central Georgia. Data collected to date indicate the ground water is a mixture of regional ground-water flow and relatively young water from the Withlacoochee River.
- **Hawaii: Ground-Water Availability**
Most ground water used on Oahu, the most-populated island in Hawaii, is withdrawn from the central corridor between the island's two mountain ranges. Withdrawal is regulated by the State to prevent salt-water intrusion, but the regulations are based on limited information about the ground-water flow system. The objective of a USGS cooperative study with the Honolulu Board of Water Supply is to quantify the ground-water resources of the northern part of the central corridor. A digital computer model of the freshwater/saltwater flow system in the entire central corridor has been constructed, and analyses from the model have helped identify the additional data needed to support decisions about management of the aquifer.
- **Kentucky: Water-Quality Trends in the Kentucky River Basin**
Detection of water-quality trends for trace elements and insecticides in many streams is often hampered because of sparse data and typically low constituent concentrations. Fresh-water mussels accumulate insecticides and trace elements in their shells and tissues at concentrations easily detected by readily available laboratory methods. The USGS, in cooperation with the Kentucky Natural Resources and Environmental Protection Cabinet and Kentucky State University, is investigating the correlation between concentrations of selected contaminants in mussel shell and tissue and long-term, water-quality trends at fixed monitoring stations in the Kentucky River basin. Results of the relation may be applicable to streams in the basin for which water-quality data are sparse.
- **Michigan and Wisconsin: Quality of Lake Superior Tributary Streams**
The USGS, in cooperation with the Michigan and Wisconsin Departments of Natural Resources, is using state-of-the-art technology to obtain estimates of contaminant loads from major tributaries to Lake Superior. Data are being collected

throughout the Lake Superior region using uniform field and laboratory techniques. A computerized long-term data base, now accessible to every agency involved in studying the Great Lakes, provides information that can be used to evaluate State and Federal efforts to mitigate the impacts of selected constituents in Lake Superior.

- **Nevada: Sediment-Transport Dynamics in the Lower Virgin River Basin**

The southern Nevada Cooperative Water Project (CWP) has proposed diversion of about 70,000 acre-feet of water from the lower Virgin River, about 40 percent of the long-term average flow. The USGS, in cooperation with the Las Vegas Water District, has begun a study to assess how the proposed diversions would change the hydraulics and sediment-transport dynamics in the highly unstable 7-mile reach of Virgin River channel between the diversion point and Lake Mead. The U.S. Fish and Wildlife Service, the National Park Service, Bureau of Reclamation, and Bureau of Land Management are interested in how the diversions and changes in sediment regime might affect the habitat in the lower river and sediment loads to Lake Mead. This study will employ intensive monitoring of sediment transport and surveying of channel geometry to support development of hydraulic and sediment-transport models to simulate potential hydrologic impacts of the proposed diversion.

- **New Jersey: Modeling Contaminant Movement in Ground Water**

Few tools are readily available to evaluate ground-water flow and potential contaminant movement in aquifer systems with secondary permeability, such as dipping layered fractured rocks. The USGS, in cooperation with Rutgers University, is investigating a ground-water plume of volatile organic compounds, to determine if ground-water flow in layered fracture rocks can be simulated satisfactorily by use of a classic porous-media ground-water-flow model.

- **New Mexico: Recharge in Arroyo Channels, Albuquerque**

The USGS, in cooperation with the city of Albuquerque, is investigating the quantity and quality of recharge to the Albuquerque-Belen ground-water basin through arroyo channels. A water-budget analysis is underway for Tijeras Arroyo at Four Hills Bridge, Albuquerque. These data are important to the development of a ground-water model for use by the city of Albuquerque in the management of the water resource.

- **North Dakota: Water-Quality of Devils Lake**

Devils Lake, typical of many closed-basin lakes, is characterized by large fluctuations in water level and in concentrations of dissolved solids. State government, local government, and water-resource management groups are concerned about the adverse effects that declining water levels and deterioration of water quality may have on sport fishing, migratory waterfowl, and recreation. In an investigation undertaken by the USGS in cooperation with the North Dakota State Department of Health, the chemical exchange between the bottom sediments and the water in the lake has been investigated. The analyses indicate that bottom-sediment processes are an important control on water quality in the lake, and that a reduction in the dissolved solids in the tributary inflow would not significantly improve water quality. This type of information is essential to water-resources managers in their development of plans for controlling water quality.

- **Oklahoma: Source of Brine Contamination in Ground Water**

The USGS, in cooperation with the Sac and Fox Nation, is conducting a ground-water quality study of the shallow fresh-water aquifer underlying the tribal lands in Lincoln County. The purpose of this study is to characterize the quality of the fresh ground water and determine if the aquifer is contaminated by brines from oil producing

activities in the area. Borehole geophysical logs from oil wells were used to construct a subsurface map indicating areas of abnormally shallow brines in the fresh-water aquifer. Ground-water sampling from test holes and geochemical modeling of the ionic species and the stable environmental isotopes indicate that the source of brine in the shallow fresh-water aquifer is from a deep oil producing formation. The information obtained from this study is being used by the U.S. Department of Justice to determine if oil producing activities have caused the degradation of the aquifer.

- Oregon: Tualatin River Water Quality

Excessive loading of phosphorus to the Tualatin River has resulted in nuisance growths of planktonic algae and periodically low concentrations of dissolved oxygen in the lower river. Previously it was thought that water-quality problems could be solved by eliminating phosphorus from waste-water treatment plants and surface runoff from urban and agricultural lands. However, the USGS investigation in cooperation with the Unified Sewerage Agency of Washington County has shown that ground water discharging to the river and its tributaries contains phosphorus concentrations 5 to 100 times larger than expected, and may hamper clean-up efforts. Phosphorus in ground water comes from both human activities and natural sources, but some of the highest concentrations seem to occur naturally in an aquifer that contains large amounts of organic matter buried by catastrophic floods during the Pleistocene Epoch. Results up to this point have prompted agencies to review remediation strategies for the Tualatin River, so that spending millions of dollars on ineffectual "best management practices" in urban and agricultural areas can be avoided.

- South Carolina: Rates of Petroleum Hydrocarbon Degradation

The USGS, in cooperation with the South Carolina Water Resources Commission, is investigating an extensively contaminated shallow water-table aquifer underlying a fuel tank farm in Hanahan, South Carolina. Data collected to date have revealed that petroleum hydrocarbons in the aquifer are being degraded anaerobically in a complex pattern of zones dominated by iron-reducing, sulfate-reducing, and methanogenic conditions that change dynamically in both time and space. Further investigation is designed to determine relative rates of hydrocarbon degradation under these conditions and how degradation rates are affected by continuous changes in conditions. This information should benefit the design of bioremediation strategies at this and similar sites nationwide.

- Tennessee: Effects of Agricultural Practices on Water Quality in the Beaver Creek Drainage Basin

Agricultural operations have been identified as the largest contributor to water quality degradation in the intensively farmed areas of west Tennessee. The purposes of this investigation, conducted by the USGS in cooperation with the Tennessee Department of Agriculture, are to document the impacts of various agricultural practices on surface and subsurface water quality and to assess the effectiveness of implementing various best management practices (BMP's). The study will determine the current quality of surface and subsurface waters in the Beaver Creek drainage basin of west Tennessee and document changes in sediment, nutrient, and pesticide levels subsequent to BMP implementation. The results are expected to show the effectiveness of different agricultural BMP's for water-quality improvement and may be transferable to other agricultural areas of Tennessee and the United States.

- Texas: Wastewater Injection, El Paso

The El Paso area in Texas is water short and ground-water levels are declining. The Hueco Bolson aquifer furnishes a portion of El Paso's water supply. About 8 billion gallons of tertiary-treated, chlorinated wastewater were injected into the aquifer from

1985 through 1991 to slow the aquifer's rate of depletion. The potential for contamination by trihalomethane (THM) compounds, potentially carcinogenic by-products of treated-water chlorination, had not been defined. In cooperation with the El Paso Water Utilities, the Texas Water Development Board, and the Bureau of Reclamation, the USGS is investigating the movement and fate of injected water in the aquifer. Results show that THM compounds in the treated water are decreased by natural processes to less than current and proposed maximum contaminant levels in public water supplies as established by the U.S. Environmental Protection Agency. These findings indicate that the present injection process can continue to extend the life of the resource without major modification and without great additional expense.

- Wisconsin: Algal Dynamics in Transport of PCB's in the Milwaukee River
Algal uptake of polychlorinated biphenyls (PCB's) and subsequent cycling of PCB-laden algal biomass may play an important role in determining the residence time and bioavailability of these organic compounds in streams and sediments. The USGS, in cooperation with the Wisconsin Department of Natural Resources, is investigating the significance of algal uptake on advective transport of PCB's in the Milwaukee River. The study will also characterize the areal extent of sediments contaminated with PCB's in the Milwaukee River, as well as predict PCB transport and fate in the river system.

SUMMARY AND CONCLUSIONS

The USGS's Federal-State Cooperative Program has responded to national needs for hydrologic information since 1895. During FY 1992, water-resources data collection, investigations, and research were conducted in cooperation with more than 1,000 State, regional, and local agencies in every State, Puerto Rico, and several Territories. Cooperative Program funding in FY 1992 totaled about \$147 million and accounted for nearly 42 percent of the total obligations for the USGS's Water Resources Division. The Cooperative Program provides much of the information required by those responsible for water-resources planning and management, water-supply development, and environmental improvement through hydrologic data collection, investigations, and research. The program is a unique activity in that, although the cooperating agencies provide more than half the funds, the USGS performs most of the work. The program is also a primary source for knowledge concerning techniques for collecting and analyzing data on the quantity, quality, use, and movement of surface water and ground water.

Because the availability of high-quality water is a fundamental limiting factor to population growth, a comprehensive and forward-looking program of hydrologic data collection and investigations is needed to provide the information necessary for the wise development and use of the Nation's water resources. The job is too large to be supported at either Federal or State level alone. The jointly planned and funded Cooperative Program provides convincing assurance that the work is designed to meet national and local needs.

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Appendix A--Cooperators by State, Fiscal Year 1992

Alabama:

Alabama Department of--
Economic and Community Affairs
Emergency Management
Environmental Management
Highways
Anniston, City of
Birmingham, City of
Coffee County Commission
Geological Survey of Alabama
Huntsville, City of
Jefferson County Commission
Mobile, City of
Montgomery, City of
Parrish, Town of
Sumter County
Tuscaloosa, City of

Alaska:

Alaska Department of--
Fish and Game
Natural Resources, Division of--
Water
Transportation
Alaska Energy Authority
Alaska Indust. Dev. & Export Authority
Anchorage, Municipality of
Cordova, City of
Juneau, City and Borough of
Kenai Peninsula Borough
Sitka, City and Borough of
University of Alaska, Fairbanks

Arizona:

Arizona Department of--
Environmental Quality
Water Resources
Cochise County Flood Control District
Gila Valley Irrigation District
Gila Water Commissioner, Office of
Hualapai Indian Tribe
Hopi Tribe Dept. of Natural Resources
Maricopa County--
Flood Control District
Water District
Metro. Water District of So. California
Navajo Nation
Pima County Dept. of Transportation
Safford, City of--
Water, Gas & Sewer Dept.
Salt River Project
Scottsdale, City of--
Water Resources Dept.
Show Low Irrigation Company
Tucson, City of

Arkansas:

Arkansas Department of--
Highway and Transportation
Parks and Tourism
Pollution Control and Ecology
Arkansas Game and Fish Commission--
Fisheries Division

Arkansas--Continued

Arkansas Geological Commission
Arkansas Soil and Water Cons. Comm.
Arkansas-Oklahoma
Arkansas River Compact Commission
Fort Smith, City of, Utility Dept.
Independence, County of
Little Rock, City of
Department of Public Works
Municipal Water Works

Rogers, City of, Water Utilities Department
Saline County Rural Development Authority
University of Arkansas--
at Fayetteville
at Little Rock

California:

Adelanto, City of
Alameda County--
Flood Control & Water Cons. District
Water District
Antelope Valley-East Kern Water Agency
California Department of--
Boating and Waterways
Fish and Game
Parks and Recreation
Pesticide Regulation
Transportation
Water Resources
California Water Resources Control Board
Calleguas Municipal Water District
Carpinteria County Water District
Casitas Municipal Water District
Channel Islands Beach Comm. Services
Coachella Valley Water District
Contra Costa County Flood Control and
Water Conservation District
Crestline-Lake Arrowhead Water Agency
Desert Water Agency
East Bay Municipal Utility District
Eastern Municipal Water District
Georgetown Divide Public Utility District
Humboldt Bay Municipal Water District
Imperial County Dept. of Public Works
Imperial Irrigation District
Indian Wells Valley Water District
Los Angeles County of
Madera Irrigation District
Marin Municipal Water District
Mendocino County Water Agency
Merced, City of
Merced Irrigation District
Metropolitan Water District of So. California
Mojave Water Agency
Mono County
Montecito Water District
Monterey County Water Resources Agency
Monterey Peninsula Water Mgmt. District
Orange County Water District
Pechanga Indian Reservation
Riverside County Flood Control and Water
Conservation District
Sacramento County Dept. of Public Works

California--Continued

Sacramento Municipal Utility District
San Benito County Water District
San Bernardino County Flood Control District
San Bernardino Valley Municipal Water District
San Diego, City of
San Diego County Dept. of Public Works
San Francisco, City and County of
San Francisco Water Department
San Luis Obispo County Eng. Department
San Mateo County Dept. of Public Works
Santa Barbara, City of, Dept. of Pub. Works
Santa Barbara County--
Flood Control & Water Cons. District
Water Agency
Santa Clara Valley Water District
Santa Cruz, City of
Santa Cruz County Flood Control and Water Conservation District
Santa Maria Valley Water Cons. District
Santa Ynez River Water Cons. District
Scotts Valley Water District
Sonoma County--
Planning Department
Water Agency
Tahoe Regional Planning Agency
Tulare County Flood Control District
Turlock Irrigation District
United Water Conservation District
Ventura County Public Works Agency
Water Master--Santa Margarita
Water Replenishment Dist. of So. California
Woodbridge Irrigation District
Yolo County Flood Control and Water Conservation District
Yuba County Water Agency

Colorado:

Arapahoe County Water and Wastewater
Arkanasa River Compact Administration
Aspen, City of
Aurora, City of
Bent, County of
Boulder, City of
Boulder, County of
Breckenridge, Town of
Centennial Water and Sanitation District
Cherokee Water and Sanitation District
Colorado Department of--
Health
Natural Resources, Oil and Gas
Conservation Commission
Transportation
Colorado, Division of--
Water Resources, Office of the State
Engineer
Wildlife
Colorado River Water Conservation District
Colorado Springs, City of--
Department of Public Utilities
Engineering Division
Colorado Water Conservation Board

Colorado--Continued

Delta County Board of Commissioners
Denver Board of Water Commissioners
Eagle County Board of Commissioners
East Grand County Water Quality Board
Englewood, City of
Evergreen Metropolitan District
Fort Collins, City of, Water and Wastewater
Fountain Valley Authority
Fremont Sanitation District
Garfield, County of
Glendale, City of
Glenwood Springs, City of
Lakewood, City of
Lamar, City of
Las Animas, City of
Longmont, City of
Loveland, City of
Lower Fountain Water-Qual. Mgmt. Assoc.
Metro. Wastewater Reclamation District
Mountain Ute Indian Tribe
Moffat, County of
No. Colorado Water Conservation District
Pueblo Board of Water Works
Pueblo, City of, Department of Utilities
Pueblo County Commissioners
Pueblo West Metropolitan District
Rio Blanco, County of
Rio Blanco Water Conservation District
Rio Grande Water Conservation District
Rocky Ford, City of
St. Charles Mesa Water District
Southern Ute Indian Tribe
Southeastern CO Water Conservancy District
Southwestern Colorado Water
Conservation District
Steamboat Springs, City of--
Public Works Department
Teller-Park Soil Conservation District
Thornton, City of
Trinchera Water Conservation District
Uncompahgre Valley Water Users Assoc.
Upper Arkansas Council of Governments
Upper Arkansas River Water Cons. District
Upper Eagle Regional Water Authority
Upper Gunnison River Water Conservancy Dist.
Upper Yampa Water Conservancy District
Urban Drainage and Flood Control District
Vail Valley Conservation Water District
Westminster, City of
Yellow Jacket Water Conservancy District

Connecticut:

Connecticut Department of--
Environmental Protection
Fairfield, Town of, Cons. Department
Meridan, City of
New Britain, City of--
Board of Water Commissioners
South Central CT Regional Water Authority
Torrington, City of

Delaware:

Delaware Geological Survey

District of Columbia:

Department of Public Works

Florida:

Bay County Utilities
Boca Raton, City of
Bradenton, City of
Broward, County of
Cape Coral, City of
Cocoa, City of
Daytona Beach, City of
Deerfield Beach, City of
Florida Department of--
Environmental Regulation
Natural Resources--
Bureau of Marine Resource & Eval.
Transportation
Florida Institute--
Phosphate Research
Florida Keys Aqueduct Authority
Fort Lauderdale, City of
Game and Freshwater Fish Commission
Hallandale, City of
Highland Beach, Town of
Hillsborough, County of
Hollywood, City of
Jacksonville, City of, Dept. of Public Utilities
Jacksonville Electric Authority
Joshua Water Control District
Lake, County of, Water Authority
Lake Mary, City of
Lee, County of
Manatee County--
Board of County Commissioners
Environmental Action Commission
Metropolitan Dade County
Miami-Dade Water and Sewer Authority
Northwest Florida Water Mgmt. District
Orange County
Perry, City of
Pinellas, County of
Polk, County of
Pompano Beach, City of
Port Orange, City of
Quincy, City of
Reedy Creek Improvement District
Sarasota, City of
Sarasota, County of
South Florida Water Management District
Dept. of Research and Evaluation
South Indian River Water Control District
Southwest Florida Water Mgmt. District
St. Johns River Water Management District
St. Petersburg, City of
Stuart, City of
Suwannee River Water Mgmt. District
Tallahassee, City of--
Electric Department
Water Quality Laboratory
Tampa, City of
Tampa Bay Regional Planning Council
Tampa Port Authority
Volusia, County of

Florida--Continued

Volusia City-County Water Supply Cooperative
Walton, County of
West Coast Reg. Water Supply Authority
Winter Park, City of

Georgia:

Albany, City of
Albany Water, Gas, and Light Commission
Attapulgus, City of
Bibb, County of
Blairsville, Town of
Brunswick, City of
Chatham County-Savannah Metropolitan
Planning Commission
Chestatee-Chattahoochee Resource
Conservation and Dev. Center
Clayton County Water Authority
Covington, City of
DeKalb County Public Works Department
Georgia Department of--
Water Protection Branch, EPD
Geologic Survey
Transportation--
at Atlanta
at Forest Park
Gwinnett, County of, Preconstruction
Division
Helena, City of
Macon County Water Authority
Monroe Water, Light and Gas Commission
Moultrie, City of
Springfield, City of
Thomaston, City of
Thomasville, City of
Tift County Commission
Tifton, City of
Valdosta, City of
Zebulon, City of

Hawaii:

Hawaii, County of, Dept. of Water Supply
Hawaii Department of--
Agriculture, Division of Agriculture
Resource Management
Hawaiian Home Lands
Land and Natural Resources
Water and Natural Resources
Transportation
Honolulu Board of Water Supply
Honolulu, City and County of, Dept. of
Public Works
Hawaii, County of, Dept. of Water Supply
Kauai, County of, Dept. of Water Supply
Maui, County of, Dept. of Water Supply

Idaho:

Bonner County Commissioners
Coeur d'Alene Tribe of Idaho
Idaho Department of--
Health and Welfare
Water Resources
Salmon River Canal Co., Ltd.
Shoshone, County of

Idaho--Continued

Southwest Irrigation District
Teton, County of
Water District No. 01 (Idaho Falls)
Water District No. 32D (Dubois)
Water District No. 31 (Dubois)

Illinois:

Bloomington and Normal Sanitary District
Cook County Forest Preserve District
Danville Sanitary District
Decatur, City of
DeKalb, City of, Public Works Department
DuPage County Forest Preserve, Planning
and Development Section
DuPage County Department of
Environmental Concerns
Illinois Department of--
Energy and Natural Resources--
State Water Survey
Transportation--
Division of Water Resources
Illinois Environmental Protection Agency
Lake County Department of Planning,
Zoning, and Environmental Quality
Metropolitan Water Reclamation District of
Greater Chicago
Northern Illinois University
Springfield, City of
State Water Survey, University of IL
Wisconsin Dept. of Natural Resources

Indiana:

Carmel, Town of, Utilities
Elkhart, City of, Water Works
Indiana Department of--
Environmental Management
Natural Resources, Division of Water
Transportation
Indianapolis, City of, Dept. of Public Works
Muncie Sanitary Dist., Bureau of Water
Quality

Iowa:

Ames, City of
Cedar Rapids, City of; Engineering Dept.
Clinton, City of
Davenport, City of
Des Moines, City of
Fort Dodge, City of
Iowa Department of--
Transportation, Highway Division
Natural Resources--
Geological Survey Bureau
Iowa State University
Muscatane Water and Light Board
University of Iowa--
Dept. of Preventive Medicine
Institute of Hydraulic Research
Hygienic Laboratory

Kansas:

Arkansas River Compact Administration
Emporia, City of, Dept. of Public Works

Kansas--Continued

Franklin, County of
Harvey, County of; Conservation District
Hays, City of
Iowa Tribe of Kansas and Nebraska
Kansas City-Wyandotte Co. Health Dept.
Kansas Department of--
Transportation
Kansas Geological Survey
Kansas State Board of Agriculture--
Div. of Water Resources
Kansas State Conservation Comm.
Kansas State University Dept. of Agronomy
Kansas University Center for Research, Inc.
Kansas Water Office
Kickapoo Tribe of Kansas
Linn, County of
Olathe, City of
Prairie Band of Potawatomi Tribe
Sac and Fox Tribe of Missouri
Wichita, City of

Kentucky:

Campbellsville Municipal Water
Elizabethtown, City of
Glasgow Water Company
Kentucky Dept. of Natural Resources &
Environmental Protection Cabinet
Metropolitan Sewer District
Owensboro, City of
University of Kentucky--
Kentucky Geological Survey
University of Louisville

Louisiana:

Caddo Parish
Capital-Area Groundwater Cons. Comm.
East Baton Rouge Parish
Jefferson Parish Dept. of Public Utilities
Louisiana Department of--
Environmental Quality
Justice
Natural Resources
Transportation and Development
Louisiana Office of Emergency Preparedness
Minden, City of
Plaquemines Parish
Sabine River Compact Administration
St. John the Baptist Parish
Terrebonne Parish
West Monroe, City of

Maine:

Caboosee Watershed District
Greater Portland Council of Governments
Maine Department of--
Conservation, Geological Survey
No. Kennebec Valley Reg. Planning Comm.
No. Maine Regional Planning Commission
University of Maine

Maryland:

Baltimore, City of--
Water Quality Management

Maryland--Continued

Delaware Geological Survey
Delaware River Basin Commission
Hyndman, Borough of
Maryland Department of--
Environment
Maryland Geological Survey
Salisbury, City of

Massachusetts:

Cape Cod Commission
Massachusetts Department of--
Environmental Mgmt.--
Division of Resource Conservation
Environmental Protection--
Division of Water Pollution Control
Environmental Protection
Bureau of Waste Site Cleanup
Environmental Protection--
Water Supply Division
Massachusetts Highway Department
Metropolitan District Commission--
Parks, Engineering & Construction Div.
Watershed Management Division

Michigan:

Adrian, City of
Ann Arbor, City of
Antrim County Drain Commission
Battle Creek, City of
Beaverton, City of
Board of--
Public Utilities
Water and Light
Cadillac, City of, Wastewater Trtmt. Plant
Clare, City of
Consumers Power Company
Elsie, Village of, Dept. of Public Works
Flint, City of, Water Plant
French Paper Company
Huron-Clinton Metropolitan Authority
Imlay, City of
Indian Lake Property Owners
Kalamazoo, City of, Dept. of Public Works
Keweenaw Bay Indian Community
Macomb, County of
Mead Paper
Michigan Department of--
Natural Resources--
Office of Budget and Federal Aid
Transportation, Design Division
Michigan Power Company
Monroe County Health Department--
Environmental Health Division
Negaunee, City of, Water and Wastewater
Treatment Plant
Norway, City of
Oakland County Drainage Commission
Otsego County Road Commission
Portage, City of
Portland, City of
STS Hydropower Ltd.
Tri-County Regional Planning Commission
Upper Peninsula Power Company

Michigan--Continued

Wayne, County of--
Div. of Environmental Health
Wisconsin Electric Power Company
Wolverine Hydroelectric
Wolverine Power Supply Cooperative
Ypsilanti Community Utility Authority

Minnesota:

Beltrami County SWCD
Elm Creek Cons. Mgmt. & Planning Comm.
Grand Portage Reservation Government
Hubbard County Soil and Water
Lower Red River Watershed Mgmt. Board
Metropolitan Waste Control Commission
Mille Lacs Reservation Band Government
Minnesota Department of--
Health, Division of Environmental Health
Natural Resources
Transportation
Minnesota Pollution Control Agency
Northwest MN Gr. Water Steering Comm.
Snake River Watershed Planning Committee
University of MN, Dept. of Soil Science
Whitewater Joint Powers Board

Mississippi:

Harrison County Development Commission
Jackson, City of
Jackson County Port Authority
Mississippi Department of--
Agriculture and Commerce
Environmental Quality--
Office of Geology
Office of Land and Water Resources
Office of Pollution Control
Transportation
Pat Harrison Waterway District
Pearl River Basin Development District
Pearl River Valley Water Supply District
Yazoo MS Delta Joint Water Mgmt. District

Missouri:

Cape Girardeau, City of
Cass County SWCD
Independence, City of
Jackson County Parks and Recreation
Mid-America Regional Council
Missouri Department of--
Conservation
Health
Natural Resources--
Division of Environmental Quality
Div. of Geological and Land Survey
Missouri Highway and Trans. Comm.
Rolla, City of
Rolla Municipal Utilities
Springfield, City of, City Utilities
St. Francis County Environmental Corp.
Sullivan, City of
Watershed Commission of the Ozarks
U. of Missouri-Columbia, Dept. of Geology

Montana:

Blackfeet Nation
Fort Peck Reservation
Greenfield Irrigation District
Helena, City of
Lower Musselshell Conservation District
Montana Bureau of Mines and Geology
Montana Department of--
Fish, Wildlife, and Parks
Health and Environmental Sciences
Natural Resources and Conservation
Transportation
Northern Cheyenne Tribe
Salish & Kootenai Tribes--Flathead Res.
Wyoming State Engineer

Nebraska:

Central Platte Natural Resources District
Kansas-Nebraska Big Blue River Compact
Administration
Lincoln, City of
Little Blue Natural Resources District
Lower Platte South Natural Resources District
Lower Republican Natural Resources District
Middle Republican Natural Resources District
Nebraska Department of--
Water Resources
Nebraska Natural Resources Commission
Nemaha Natural Resources District
North Platte Natural Resources District
Omaha, City of
Papio-Missouri River Natural Resources District
South Platte Natural Resources District
U. of Nebraska, Cons. and Survey Division
Upper Elkhorn Natural Resources District
Upper Niobrara-White Natural Res. District
Upper Republican Natural Resources District

Nevada:

Carson City/County Department of Public Works
Clark County Regional Flood Control District
Clark County Sanitation District
Douglas, County of
Duck Valley Reservation
Henderson, City of
Las Vegas, City of
Las Vegas Valley Water District
Nevada Bureau of Mines and Geology
Nevada Department of--
Conservation and Natural Resources--
Division of Environmental Projects
Division of Water Resources
Transportation
Wildlife
Summit Lake Paiute Indian Tribe
Tahoe Regional Planning Agency
Washoe County

New Hampshire:

New England Interstate Water Pollution Control
Commission
New Hampshire Department of--
Environmental Services
Vermont Department of Environmental
Conservation

New Jersey:

Bergen, County of
Brick Township Municipal Utility Authority
Gloucester County Planning Commission
Mercer County Park Commission
Morris County Municipal Utility Authority
New Brunswick, City of
New Jersey Dept. of Environmental Protection
New Jersey Water Supply Authority
North Jersey District Water Supply Commission
Passaic Valley Water Commission
Pinelands Commission
Rutgers State University
Somerset County Board of Chosen Freeholders
Washington Township Municipal Utility Authority
West Windsor, Township of

New Mexico:

Albuquerque, City of--
Hydrology Division
Utility Planning Division
Waste Water Utility
Albuquerque Metro. Arroyo Flood Control
Authority
Arizona Department of Environmental Quality
Bernalillo, County of
Canadian River Municipal Water Authority
Costilla Creek Compact Commission
Elephant Butte Irrigation District
Highway and Transportation Department
La Cienega Acequia Association
Las Cruces, City of
Las Vegas, City of
Navajo Indian Nation, Department of
Environmental Protection
New Mexico Environment Department
New Mexico State University, Water Resources
Research Institute
Office of the State Engineer
Pecos River Commission
Pueblo of Zuni
Raton, City of
Rio Grande Compact Commission
Rio San Jose Flood Control District
Ruidoso, Village of
Santa Rosa, City of

New York:

Amherst, Town of, Engineering Department
Auburn, City of
Batavia, City of
Chautauqua, County of, Department of Planning
and Development
Cheektowaga, Town of
Cornell University
Cortland, County of
Essex, County of, Planning Department
Hudson-Black River Regulation District
Kiryas Joel, Village of
Monroe, County of, Dept. of Environmental
Health
Nassau, County of--
Department of Health

New York--Continued

Department of Public Works
New England Interstate Water Pollution Control
Commission
New York City Dept. of Env. Protection--
Bureau of Water Supply
New York State Department of--
Env. Cons. Planning and Restoration
Transportation
New York State Power Authority
Nyack, Village of, Board of Water Comms.
Onodaga, County of--
Department of Drainage and Sanitation
Water Authority
Orange County Water Authority
Saratoga Springs, City of
Schuyler County Department of Planning and
Economic Development
State University of New York, Syracuse
Suffolk, County of--
Department of Health Services
Water Authority
Tompkins, County of, Department of Planning
Ulster, County of
Victor, Village of

North Carolina:

Asheville, City of
Bethel, Town of
Brevard, City of
Chapel Hill, Town of
Charlotte, City of
Danville, City of
Durham, City of
Fayetteville, City of
Greensboro, City of
Lexington, City of
Lumber River Council of Governments
Mecklenburg, County of
Morganton, City of
North Carolina Cooperative Extension Service
North Carolina Department of--
Environment, Health, and Natural Resources
Transportation
North Carolina Wildlife Resources Commission
Orange, County of
Raleigh, City of
Rocky Mount, City of
Triangle Area Water Supply Monitoring, Project
Steering Committee
Western Piedmont Council of Governments

North Dakota:

Devils Lake Sioux Tribe
Dickinson, City of
Lower Heart Water Resources District
Minot, City of
North Dakota Department of--
Game and Fish
Health, Water Supply, and Pollution Control
Parks and Recreation
Transportation
North Dakota Geological Survey
State Water Commission
Three Affiliated Tribes

Ohio:

Akron, City of
Canton, City of
Columbus, City of
Franklin, County of
Fremont, City of
Lima, City of
Madison, County of
Miami Conservancy District
N.E. Ohio Regional Sewer District
Ohio Department of--
Natural Resources
Transportation
Ohio Environmental Protection Agency
Ohio State University, Department of Agronomy
Ross, County of
Seneca Soil and Water District
Summit County Engineers
Toledo Metropolitan Area Council of Govs.
University of Toledo

Oklahoma:

Ada, City of
Cheyenne and Arapaho Tribes
McGee Creek Authority
Oklahoma Conservation Commission
Oklahoma Department of--
Agriculture
Health
Oklahoma Geological Survey
Oklahoma Pollution Control Board
Oklahoma Water Resources Board
Sac and Fox Nation

Oregon:

Albany, City of
Ashland, City of
Clark County, Washington--
Intergovernmental Resources Center
Confederated Tribes of the Warm Springs Res.
Coos Bay-North Bend Water Board
Coos, County of
Douglas, County of
Eugene, City of, Water and Electric Board
Gresham, City of
Jackson, County of
Josephine County Department of Public Works
McMinnville, City of, Water and Light Dept.
Oregon Department of--
Environmental Quality
Human Resources, State Health Division
Metropolitan Service District
Transportation, Highway Commission
Water Resources
Portland, City of--
Bureau of--
Environmental Services
Water Works
Rogue Valley Council of Governments
Umatilla Indian Reservation
United Sewerage Agency
Washington State Department--
Ecology
Wildlife

Pennsylvania:

Allentown, City of, Engineering Department
Alliance for the Chesapeake Bay
Bethlehem, City of
Bucks, County of
Chester, County of, Water Resources Authority
Delaware County Solid Waste Authority
Delaware River Basin Commission
Fairfax County Water Authority
Harrisburg, City of, Department of Public Works
Hazelton City Authority Water Department
Letort Regional Authority
Media Borough Water Department
New York State Dept. of Env. Conservation
North Penn Water Authority
North Wales Water Authority
Philadelphia, City of, Water Department
Pennsylvania Department of--
Environmental Resources--
Bureau of Community Env. Control
Bureau of Mining and Reclamation
Bureau of Soil and Water Conservation
Bureau of Topographic & Geologic Survey
Bureau of Water Quality Management
Bureau of Water Resources Management
Pennsylvania State University
Pike County Planning Commission
Reading, City of
Somerset Conservation District
Susquehanna River Basin Commission
Tinicum, Township of
University Area Joint Authority
University of Delaware, Geological Survey
West Bradford, Township of
Williamsport, City of

Rhode Island:

Providence, City of, Water Supply Board
Rhode Island State Department of Env. Mgmt.--
Division of Water Resources
State Water Resources Board

South Carolina:

Beaufort-Jasper County Water and Sewer Auth.
Camden, City of
Charleston Harbor Project
Charleston Public Works
Clarendon/Sumter Soil & Water Cons. District
Myrtle Beach, City of
Oconee County Sewer Commission
Pageland, Town of
Pickens, County of
South Carolina Department of--
Health and Env. Control
Highways and Public Trans.
So. Carolina Public Service Authority
So. Carolina Water Resources Commission
South Carolina Sea Grant Consortium
Spartanburg Sanitary Sewer District
Spartanburg Water System
University of South Carolina--
Department of Env. and Health Services
Waccamaw Regional Planning and

South Carolina--Continued

Development Council
Western Carolina Regional Sewer Authority

South Dakota:

Area II Minnesota River Basin
Beadle Conservation District
Belle Fourche Irrigation District
East Dakota Water Development District
Lower Brule Sioux Tribe
Mellette County
Oglala Sioux Tribe, Pine Ridge
Rapid City, City of
Rosebud Sioux Tribe
Sioux Falls, City of--
Utilities Department
Water Purification Plant
South Dakota Department of--
Environment and Natural Resources--
Geological Survey Division
Water Resource Management Division
Water Quality Division
Water Rights Division
Game, Fish, and Parks
Transportation
South Dakota School of Mines and Technology
South Dakota State University
Spearfish, City of
Stanley County Conservation District
Watertown, City of
West Dakota Water Development District
West River Water Development District
Wyoming, State of

Tennessee:

Alcoa, City of
Alpha Talbott Utility District
Bartlett, City of
Camden, City of
Chattanooga, City of, Dept. of Public Works
Clemson U. Det. of Environmental Toxicology
Columbia, City of
Crossville, City of
Dickson, City of
Eastside Utility District
Franklin, City of
Germantown, City of
Grainger County Government
Hamilton County Office of Emergency Mgmt.
Humphreys, County of
Johnson City, City of, Public Works Department
Knoxville, City of
Lawrenceburg, City of
Lincoln, County of, Board of Public Utilities
Memphis, City of--
Light, Gas, and Water Division
Memphis State University
Metropolitan Governments, Nashville, City of,
and Davidson, County of
Murfreesboro, City of, Water and Sewer Dept.
Pigeon Forge, City of
Rogersville, Town of
Savannah Valley Utility District
Sevierville, City of

Tennessee--Continued

Shelby County Government
Tennessee Department of--
Agriculture
Environment and Conservation--
Office of Water Programs
Transportation--
Division of Planning
Division of Structures
Tennessee State Planning Office
Tennessee Wildlife Resources Agency
Tulahoma Utilities Board
Union City, City of
University of Tennessee
Upper Duck River Development Agency
Wartrace, City of

Texas:

Abilene, City of
Alamo Water Reuse Conservation District
Arlington, City of
Austin, City of
Barton Springs/Edward Aquifer Cons. District
Bexar-Medina-Atascosa Counties
Brazos River Authority
Coastal Water Authority
Colorado River Municipal Water District
Corpus Christi, City of
Dallas, City of
Dallas, City of, Public Works Department
Edwards Underground Water District
El Paso, City of, Public Service Board
Fort Bend Subsidence District
Fort Worth, City of, Water Pollution Control
Gainesville, City of
Galveston, County of
Garland, City of, Department of Public Works
Georgetown, City of
Graham, City of
Greenbelt Municipal and Industrial Water Auth.
Guadalupe-Blanco River Authority
Harris, County of, Flood Control District
Harris-Galveston Coastal Subsidence District
Houston, City of
Lavaca-Navidad River Authority
Lower Colorado River Authority
Lower Neches Valley Authority
Lubbock, City of
Nacogdoches, City of
North Central Texas Council of Governments
North Central Texas Municipal Water Authority
North Texas Municipal Water District
Northeast Texas Municipal Water Authority
Orange, County of
Pecos River Commission
Red River Authority
Sabine River Authority of Texas
Sabine River Compact Administration
San Angelo, City of
San Antonio, City of--
Public Service Board
Water Board
San Antonio River Authority
San Jacinto River Authority

Texas--Continued

Somerville County Water District
Tarrant, County of, Water Control and
Improvement District No. 1
Texas Soil and Water Conservation Board
Texas State Dept. of Highways and Trans.
Texas Water Development Board
Titus, County of, Fresh Water Supply Dist. No. 1
Trinity River Authority
Upper Guadalupe River Authority
Upper Neches River Municipal Water Authority
West Central Texas Municipal Water District
Wichita, Co. of, Water Improvement Dist. No. 2
Wichita Falls, City of

Utah:

Bear River Commission
Central Utah Water Conservation District
Ogden River Water Users Association
Salt Lake, County of, Division of Flood Control
Tooele, City of
Utah Department of--
Health, Division of Environmental Health
Natural Resources--
Geological and Mineral Survey
Oil, Gas, and Mining Division
Water Resources Division
Water Rights Division
Weber Basin Water Conservancy District
Weber River Water Users Association

Vermont:

Department of--
Environmental Conservation

Virginia:

Accomack-Northampton Planning Dist. Comm.
Alexandria, City of
Delaware Geological Survey
Hampton Roads Planning District Commission
James City, County of
Maryland, Department of--
Environment
State Highway Administration
Newport News, City of
Northern Virginia Planning District Commission
Prince William Health District
Roanoke, City of
Southeastern Public Service Auth. of Virginia
University of Virginia, Dept. of Env. Sciences
Virginia Department of Transportation
Virginia Beach, City of, Water Resources Div.
Virginia Institute of Marine Science
Virginia State Water Control Board
York, County of

Washington:

Aberdeen, City of
Bellevue, City of
Chelan, County of, Public Utility District No. 1
Confederated Tribes and Bands of the Yakima
Indian Nation
Douglas, County of, Public Utility District No. 1
Hoh Indian Tribe

Washington--Continued

King, County of, Department of Public Works
Lewis, County of--
Board of Commissioners
Nisqually Indian Tribe
Oregon Department of Fish and Wildlife
Pacific County
Pierce, County of
Quinault Indian Business Committee
Seattle, City of
Seattle-King County Department of--
Health
Skagit, County of, Department of Public Works
Skagit Conservation District
Snohomish, County of--
Board of Commissioners
Public Utilities District No. 1
Spokane County Engineers Office
Tacoma, City of, Department of--
Public Utilities
Public Works
Thurston, County of
Board of Commissioners
Department of Public Works
Umatilla Indian Nation
Washington Department of--
Ecology
Fisheries
Natural Resources
Wildlife
Washington State Emergency Services
Whatcom, County of

West Virginia:

Morgantown, City of, Utility Board
New Martinsville, City of
West Virginia Department of--
Commerce, Tourism, and Parks Section
Highways
West Virginia Office of Water Resources
West Virginia Geological and Economic Survey

Wisconsin:

Balsam Lake Protection and Rehab. District
Barron, City of
Bear Lake, Town of
Beaver Dam, City of
Big Muskego Lake District
Brown County Planning Commission
Dane, County of--
Department of Public Works
Lakes and Watershed Management
Regional Planning Commission
Darboy Sanitary District
Delavan, Town of
Druid Lake Inland Protection and Rehab. District
Eagle Springs Lake Sanitary District
East Central Wisconsin Reg. Planning Comm.
Fond Du Lac, City of
Fowler Lake Management District
Galena, City of
Green Bay Metropolitan Sewerage District
Green Lake Sanitary District
Hillsboro, City of

Wisconsin--Continued

Hooker Lake District
Hubbard, Township of
Illinois Department of Transportation
Kaukauna Electric and Water Utilities
Kimberly Water Works Department
Lac Du Flambeau Indians
Lake Nebagamon, Village of
Little Arbor Vitae Protection and Rehab. District
Little Green Lake Protection and Rehab. District
Little Chute, Village of
Little St. Germain Lake District
Loon Lake/Wescot Management District
Madison Engineering Department
Madison Metropolitan Sewerage District
Marinette County Land Conservation
Mead, Township of
Menasha, Town of, Sanitary Dist. Number Four
Menominee Indian Tribe of Wisconsin
Merton, Township of
Muskego, City of
Norway, Town of
Oconomowoc Lake, Village of
Okauchee Lake Management District
Oneida Indian Tribe of Wisconsin
Oshkosh, City of
Peshtigo, City of
Powers Lake Management District
Red Cliff Indians
Rock, County of, Public Works Department
SE Wisconsin Regional Planning Commission
Sparta, City of
St. Germain, Town of
Stockbridge-Munsee Indians
Sumit, Town of
Thorp, City of
Troy, Town of
University of Wisconsin, Extension, Geological
& Natural History Survey
Walworth County Land Conservation Comm.
Waupun, City of
Whitewater-Rice Lake Management District
Wind Lake Management District
Wisconsin Department of--
Justice
Natural Resources
Transportation
Wisconsin Geological Survey
Wittenberg, Village of

Wyoming:

Cheyenne, City of
Evanston, City of
Freemont, County of
Midvale Irrigation District
Northern Arapahoe Tribe
Sheridan Area Water Supply Joint Power Board
Shoshone Tribe
Teton, County of
Water Development Commission
Wyoming Department of--
Agriculture
Environmental Quality
Game and Fish

Wyoming--Continued

Highways
Wyoming State Engineer
Wyoming Water Research Center

American Samoa:

American Samoa EPA
American Samoa Power Authority

Guam:

Guam, Government of, Environmental
Protection Agency

Trust Territory of the Pacific Islands:

Commonwealth Utilities Corporation, Saipan
Northern Mariana Islands, Commonwealth of--
Department of Public Health and
Environmental Services
Municipality of--
Tinian
Pohnpei State Government
Republic of Palau

Puerto Rico:

Puerto Rico Aqueduct and Sewer Authority
Puerto Rico Department of Natural Resources
Puerto Rico Electric Power Authority
Puerto Rico Environmental Quality Board
Puerto Rico Industrial Development Company
University of the Virgin Islands
Virgin Islands Water and Power Authority