

FEASIBILITY OF PRIVATIZATION
OF THE HYDROLOGIC DATA COLLECTION AND ANALYSIS FUNCTIONS
OF THE U.S. GEOLOGICAL SURVEY

U.S. GEOLOGICAL SURVEY

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CONTENTS

	<u>Page</u>
Executive summary.....	1
Introduction.....	5
Background.....	5
Definitions.....	6
Acknowledgements.....	7
Hydrologic data-collection program.....	8
Overview of the program.....	8
Program functions analyzed.....	10
Full Time Equivalents (FTE).....	11
Privatization in the Water Resources Division.....	13
Present status.....	13
Examples.....	15
Coal-area study.....	16
National Water-Use Information Program.....	19
Laboratory Services.....	21
New York gaging station maintenance.....	22
Analysis of feasibility.....	22
Onsite data collection and office analysis.....	24
Surface-water-quantity data.....	24
Ground-water-quantity data.....	29
Data on water quality.....	29
Water use.....	32
Laboratory analysis.....	32
Publication and distribution.....	33
Equipment procurement and supply.....	34
Construction and maintenance.....	35
Experience of other government agencies.....	35
International view.....	37
Interest among potential contractors.....	39
User reaction to potential changes.....	40
Changes in the WRD under privatization.....	42
Summary and Conclusions.....	42
References.....	45
Appendices.....	48
A. WRD policy on direct expenditures.....	49
B. Summary of contractor operated data stations (from Kilpatrick and others, 1983, p. 4).....	51
C. List of surface-water cost-effective analysis reports.....	52
D. Summary evaluation of 1984 water-quality data-collection activities in Colorado and Ohio (from Childress and others, 1989).....	54
E. Primary Department of Defense functions included in 25 categories of functions (from GAO, 1988, Appendix I, pp. 30-32).....	55
F. ASCE questionnaire on surface-water and ground-water data collection.....	57
G. ASCE policy statement on surface-water data collection.....	60
H. Statement of William J. Carroll, President-elect, ASCE, before the Subcommittee on Interior and Related Agencies, Committee on Appropriations, U.S. House of Representatives....	61

ILLUSTRATIONS

	<u>Page</u>
Figure 1. Diagram showing sources of funds for hydrologic data collection, fiscal year 1988.....	8
2. Diagram showing distribution of funds for hydrologic data collection, fiscal year 1988.....	9
3. Diagram showing data program related FTE, by function	12
4. Graph showing WRD procurement expenditures for fiscal years 1978-88.....	14
5. Graph showing WRD procurement funding as a percent of total WRD program funds and WRD appropriated funds, fiscal years 1978-88.....	14
6. Graph showing Direct Services credits associated with data collection for fiscal years 1978-88.....	16
7. Map showing locations of contract hydrologic data-collection stations (from Kilpatrick and others, 1983, p. 3).....	18
8. Graph showing percentage of stations by category of use.....	26
9. Graph showing percentage of stations versus numbers of use categories.....	27
10. Graph showing percentage of single-purpose stations by category of use.....	28
11. Graph showing percentage of Hydrologic Instrumentation Facility funds devoted to procurements, FY 1984-88	34

TABLES

Table 1. Number of full time employees (FTE) involved in the WRD's hydrologic data-collection and analysis program, distributed by function.....	12
2. Distribution of Direct Services by data-collection project and by function, fiscal year 1989.....	15
3. Summary of data uses for continuous-record streamflow stations surveyed in the 1983-88 surface-water network evaluation.....	26
4. Number of streamflow stations with the indicated number of uses for the data.....	27
5. Summary of Dialog data base entries on privatization of data collection.....	36

FEASIBILITY OF PRIVATIZATION OF
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OF THE U.S. GEOLOGICAL SURVEY

By

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EXECUTIVE SUMMARY

Purpose

The Department of the Interior's Office of Management Improvement asked the U.S. Geological Survey (USGS) to investigate the feasibility of privatizing the hydrologic data-collection and analysis activity of the Water Resources Division (WRD). The analysis was requested to advance the objectives of Executive Order 12615, Performance of Commercial Activities. The purpose of the study as described by the Office of Management Improvement (written commun., January 31, 1989) was to determine the extent to which it would be feasible to have the data-collection and analysis activity performed by the private sector. The private sector was defined as "non-Federal," therefore, State and local governments (including universities) were considered to be in the private sector for the feasibility study.

Process

The study was conducted during 1989 by an eight-member committee of WRD employees. A six-member outside Review Committee, including three non-Federal members and representing the hydrologic community, was established to provide advice to the study team. The Review Committee members also individually reviewed this final report. In addition, a liaison team comprised of representatives of both the Office of Management Improvement and the Office of the Director, USGS, provided guidance to ensure that the study remained focused on the original objectives.

The process used and the steps followed in determining the potential for additional privatization of the hydrologic data-collection activities of the WRD were described in the plan of study. The major steps were:

- o Define the component functions of hydrologic data collection and analysis and determine the number of related full-time equivalents (FTE) required to perform those functions.
- o Determine the present degree of privatization.
- o Screen the component functions against OMB Circular A-76 definitions to determine which of the functions are governmental and which are commercial.
- o For component functions determined to be commercial, determine which can be satisfactorily performed for the USGS by non-Federal entities.

Results in Brief

For the feasibility study, hydrologic data-collection and analysis activities were subdivided into the following six component functions: onsite data collection, office analysis, laboratory analysis, publication and distribution, equipment procurement and supply, and construction and maintenance of field installations. Currently (1989), there are 1,417 FTE in the hydrologic data-collection program. About 74 percent of these FTE are involved in the primary functions of onsite data-collection and office-analysis; an additional 10 percent are involved in laboratory analysis. The remaining 16 percent of the FTE are distributed among the support functions as follows: publication and distribution, 4 percent; equipment procurement and supply, 4 percent; and construction and maintenance, 8 percent.

Only 10 percent of the WRD's hydrologic data-collection activities are independently funded by USGS from Federal funds. About 26 percent of the total funding comes from other Federal agencies, and the remaining 64 percent comes from the Federal-State Cooperative Program, in which States and local agencies must contribute at least one-half the funds. The current program has evolved over about 100 years and includes participation of more than 900 Federal, State, and local cooperators, who view the data-collection activities as a shared governmental responsibility in which they have a large, long-term financial investment and vested interest.

The WRD currently practices two forms of privatization: 1) contracting with private entities, and 2) allowing credit for services provided (internally called Direct Services) by cooperating State and local government agencies. WRD contracts with private entities totaled \$65 million in FY 1988. This amount represents 23.3 percent of the total WRD program funds available in FY 1988. Because total WRD program funds include non-Federal funds in the Cooperative Program and reimbursement from other Federal agencies, the \$65 million actually represents 43.5 percent of the Federal funds appropriated by the Congress to the WRD in FY 1988. These contracts are distributed among all programs of the WRD; however, the portions that apply to data-collection and analysis activities should be similar to the WRD percentages.

The second form of privatization, use of Direct Services credits, totaled \$8.3 million in just the data-collection and analysis program in FY 1988. About one-half of that amount was for the collection of water-use data. Under the water-use program, State agencies collect the data and receive Direct Service credits. Because those credits amount to about 40 percent of the total funds in the water-use program, that program is 40 percent privatized under the definitions of this study.

In assessing the potential for additional privatization, the individual functions were compared to definitions of governmental functions in OMB Circular A-76. Based on the comparison, the onsite data collection and office analysis functions are judged to be governmental functions because of the delegation of authority to, and the exercise of discretion by, the person collecting the data. The data collected at each site are unique and must be accurate and timely, but the field person encounters changing hydrologic conditions and must react accordingly. Because of this, the data collectors must make management decisions on the spot as a part of their every-day duties. Similarly, the laboratory analysis function and the

equipment procurement and supply function are judged to be governmental because of the emphasis on administration, oversight, and quality control of contracts. In spite of these determinations, all six functions were included in the remainder of the feasibility analysis.

The potential for additional privatization of either the onsite data collection or the office analysis functions is limited. The multiple uses of, and the reliance on, the data for national and regional analyses would require that the data continue to be available in the public domain. Given that privatization would necessarily result in numerous entities collecting hydrologic data across the nation, the USGS would have to perform stringent quality assurance before the data could be certified and published. Such requirements would likely cause the costs of data under privatization to be greater than present costs.

A retrospective analysis by Kilpatrick and others (1983) reported that costs of collecting hydrologic data by contract for coal-lease areas of six States during 1978-81 were about 55 percent greater than the cost of performing the same work using WRD personnel. Similarly, a review of the work of the Water Resources Branch of the Inland Waters Directorate of Environment Canada by R.L. Walker & Partners and Acres International Limited (1985) concluded there was little probability that the private sector could operate at the same or lesser level of cost. They reported considerable concern by the clients and users regarding any changes that could adversely impact the consistency and quality of data, and noted that privatization did not appear practical or economic in terms of major functions.

About 10 percent of all surface-water station records published and archived by USGS are furnished by other agencies. The bulk of these data are collected by State and local agencies for Direct Services credits under the Cooperative Program and are, therefore, already privatized under the definitions of this study. However, excepting water-quality data collected to satisfy specific purposes, only about 25 percent of the States operate significant numbers of hydrologic data-collection stations (Office of Water Data Coordination, 1981). It is unlikely that States not presently collecting significant amounts of hydrologic data would develop that capability in the near future.

Responses to questionnaires circulated by the American Society of Civil Engineers (ASCE) in conjunction with this feasibility study suggest that enthusiasm for taking on the data-collection role is limited in the non-governmental sector. Fourteen firms active in water-resources related consulting were polled, and five responses were received. Only one firm expressed a major interest in collecting hydrologic data under privatization; that firm currently collects such data at fewer than ten sites. Nationwide privatization, therefore, may be problematic.

The potential for additional privatization of either the laboratory analysis function or the equipment procurement and supply function is perhaps moot. Both functions presently contain a significant degree of privatization, and both have a heavy emphasis on administration, oversight, and quality control of contracts. Further privatization would jeopardize WRD's ability to perform those roles.

Publication and distribution is a support function with little opportunity for additional privatization. All annual water-data reports are now printed by contract printers; given the distributed nature of the work load and the relatively small total effort, privatizing the remainder of this function would not be cost effective.

Construction and maintenance has potential for additional privatization, but realizing that potential will depend largely on having sufficient work in a given area to attract potential contractors. Presently, equipment such as tractor-mounted backhoes needed to build stream-gaging stations is usually obtained either from local cooperators through Direct Services credits or by hiring local contractors.

Principal Findings

The Federal hydrologic data-collection efforts and networks are widely held to be appropriate Federal functions. Many independent organizations have formally expressed dismay at recent shrinkage in the number of stream-gaging stations. If additional privatization causes hydrologic data-collection costs to rise, the number of stations in operation will decrease. Any further reduction in data-collection networks would increase the difficulty of assessing the status of the nation's water resources. Before additional privatization of data-collection activities is undertaken, the stakeholders would have to be convinced there would be no decline in either the quantity or quality of the data collected.

There is little support among cooperating agencies or data users for accelerated privatization of the data-collection program of the WRD. The Review Committee members expressed grave concern about the effects of privatization on data continuity, credibility, and legal acceptability. They felt this could severely impact long-standing relations between the WRD and its local, State, and Federal cooperators. Similar concerns were expressed by a broadly-based cross section of non-Federal agencies and individuals (Advisory Committee on Water Data for Public Use, written commun., May 31, 1989).

Current data-collection programs provide institutional expertise and memory necessary to maintain program stability and effectiveness. The USGS, in its governmental role, integrates multiple funding sources to produce multiple-use data networks that would soon deteriorate under large-scale privatization. In recent years, in fact, the non-Federal contributors have been willing to spend considerably more than the Federal Government could match in the Cooperative Program. The current flexibility employed in the data-collection program has been determined on a State-by-State basis through hundreds of joint-funding agreements.

The WRD is currently contracting for a significant portion of its hydrologic data-collection activities, and additional opportunities should be evaluated on a case-by-case basis. Large-scale privatization of a greater portion of the WRD's hydrologic data-collection activities would be disruptive and might render a valuable engineering resource worthless. Any additional privatization must be carried out such that there is no loss of confidence in the data and USGS objectivity is not compromised.

INTRODUCTION

The U.S. Geological Survey (USGS) has been asked by the Department of the Interior's Office of Management Improvement to investigate and evaluate the feasibility of increasing privatization of various aspects of its hydrologic data-collection activities. The analysis was requested to advance the objectives of Executive Order 12615, Performance of Commercial Activities. The purpose of the study as described by the Office of Management Improvement (written commun., January 31, 1989) was to determine the extent to which it would be feasible to have the data-collection and analysis activity performed by the private sector. The private sector was defined as "non-Federal," therefore, State and local governments (including universities) were considered to be in the private sector for the feasibility study.

Background

The Water Resources Division (WRD) of the USGS derives its hydrologic data-collection activities from the mission of USGS which, in part, is to provide the hydrologic information needed by others to help define and manage the Nation's water resources. These activities have been ongoing for more than 100 years and are a major part of the total historical record of the Nation's water resources. This represents a long period of involvement by the WRD in an activity that has been a governmental function because of the need of the Nation to have a continuous, well documented, unbiased, and broad-based source of reliable and consistent water data with which to guide and make management, policy, and regulatory decisions at all levels of government--from Federal to State to local.

The WRD is unique in the Federal Government, both in the role it occupies in the hydrologic community and in the way operations are funded. In addition to collecting hydrologic data, the WRD is recognized as setting the standards by which hydrologic data are collected. Thus, the data collected by the WRD find many uses beyond those for which the data may originally have been intended.

The WRD's hydrologic data-collection activities are funded from three primary sources: 1) Federal funds directly designated by Congress for use by the USGS for data collection; 2) Federal funds made available by Congress to the USGS for matching of State offerings to support these activities (the Federal-State Cooperative Program); and 3) transfer of funds from other Federal agencies to meet their water resources data needs. The hydrologic data-collection stations operated by the WRD play a key role in both Federal- and State-agency efforts to protect the lives and welfare of the general public. For example, many of the gaging stations operated by the USGS are used by the U.S. Army Corps of Engineers to operate more than 2,000 flood control, navigation, and water-supply reservoirs. More than 3,000 of the stations form the National Weather Service's flood-forecasting system. At the State and inter-State level, many of the data-collection stations serve a key role in the judicial process of allocating and regulating water rights. Many of these decisions directly and indirectly impact the Federal Government.

The USGS independently funds less than 10 percent of its water-data collection activities. Many of the sites at which water data are collected are funded from multiple sources (other Federal, State, and local agencies), each of which has a proprietary interest in the activity. The State agencies, for example, view the data-collection activities in the Federal-State Cooperative Program as a shared governmental responsibility in which they have a large, long-term financial investment and vested interest. This investment and vested interest is carefully guarded, and changes in data-collection activities must be negotiated to mutual satisfaction. As a result of the strong vested interest by the USGS's cooperators in the data-collection program, changes in the way the program is carried out requires sensitivity to user reactions, thereby inhibiting unilateral action by the USGS.

Definitions

The President's Commission on Privatization (1988) discussed three techniques of privatization: 1) selling of Government assets; 2) contracting, under which the Government enters into contracts with non-Federal entities to provide goods and services needed by the Government or demanded by the public; and 3) the use of vouchers, whereby the Government distributes purchasing power (in the form of vouchers) to consumers, who then spend the funds on designated goods or services. Only the second technique, contracting, is applicable to the data products of the WRD. Therefore, this feasibility study considered only the option of contracting.

This is a feasibility study and is not governed by OMB Circular A-76 (August 4, 1983). The definitions of Circular A-76 are used, however, to define whether functions are inherently private or governmental. Those definitions include the following:

A commercial source is a business or other non-Federal activity located in the United States, its territories and possessions, the District of Columbia or the Commonwealth of Puerto Rico, which provides a commercial product or service.

A governmental function is a function which is so intimately related to the public interest as to mandate performance by Government employees. Governmental functions fall into two categories: (1) The act of governing; i.e., the discretionary exercise of Government authority. Examples include criminal investigations, prosecutions, and other judicial functions; management of Government programs requiring value judgements, as in directing the national defense; and regulation of the use of space, oceans, navigable rivers, and other natural resources. (2) Monetary transactions and entitlements, such as benefit programs; tax collection and revenue disbursements control of the treasury, accounts and money supply; and the administration of public trusts.

OMB Circular No. A-76 does not apply to the conduct of research and development. However, severable activities in support of research and development are commercial activities that are subject to the Circular.

For the purposes of this feasibility study, a State or local government agency that provides a service is considered to be a commercial source. This effectively causes Privatization to be equivalent to "non-Federal". Under this definition, State and local governments are considered to be in the "private sector" when working with WRD through the Cooperative Program.

Acknowledgments

This study was conducted in 1989 by a committee composed of employees of the WRD. A liaison team comprised of representatives of both the Office of Management Improvement and the Office of the Director, USGS, provided guidance to ensure that the study remained focused on the original objectives. Meetings were held with liaison-team members on January 31 and April 20 to discuss the plan of study, and on May 18, June 27, and July 6 to review progress and interim results.

A six-member Review Committee was assembled to provide reaction and guidance from individuals representing a broad cross section of the users of hydrologic data. Members of the Review Committee were:

Mr. William P. Henry, Senior Vice President, Aqua Resources, Inc., Berkeley, California;

Mr. Peter G. Morros, State Engineer of Nevada, Carson City, Nevada.

Dr. Jerome A. Westphal, Professor of Civil Engineering, University of Missouri at Rolla, Rolla, Missouri;

Dr. John C. Schaaake, Senior Scientist, National Weather Service, Silver Spring, Maryland;

Dr. Jimmie L. Thomas, Chief, Surface Water Branch, U.S. Bureau of Reclamation, Denver, Colorado; and

Dr. Ming Tseng, Office of the Chief of Engineers, U.S. Army Corps of Engineers, Washington, D.C.;

Henry is a consulting engineer and was recommended by the American Society of Civil Engineers (ASCE) to represent ASCE; Morros is a State cooperator and currently serves as Chairman of the Association of Western State Engineers; Westphal, as a professor teaching hydrology at a major university, represents academia. Schaaake, Thomas, and Tseng represented their organizations, which are major users of hydrologic data. All members were representatives of the hydrologic community at large.

The Review Committee met with the study committee May 31, 1989, to review the plan of study and on July 25, 1989, to review status and progress. In addition, they individually reviewed this final report. Their suggestions regarding possible approaches, methods of presentation, and interpretations have been invaluable. We thank them for their contributions, but must absolve them of blame for errors; those are the responsibility of the study committee.

HYDROLOGIC DATA-COLLECTION PROGRAM

Overview of the Program

The USGS's WRD collects hydrologic data in the conterminous United States, Alaska, Hawaii, Puerto Rico, and the Trust Territories. These activities involve the measurement of streams, lakes, and reservoirs for either discharge, stage, or both; the fluctuation of ground-water levels; the quality of ground water, surface water, and precipitation; transport of sediment; and the determination of water use. The WRD operates more than 12,000 surface-water stations (about 7,000 of which provide continuous records of daily discharge), approximately 32,000 ground-water stations, about 3,200 surface-water and 9,000 ground-water quality stations, about 900 precipitation stations, about 80 precipitation-quality stations (not including the Acid Rain Program's National Trend Network), and about 1,000 sediment stations (Condes and others, 1987). Many of the stations are supported by more than one source of funding.

Activities in the data program are supported by funds directly appropriated by Congress to the USGS, by Federal funds that match State and local offerings, and by transfer of funds from other Federal agencies to the USGS (see figure 1). Of the \$106 million that the WRD received for hydrologic data-collection activities in fiscal year (FY) 1988, 58 percent was for surface-water quantity, 15 percent for ground-water quantity, 16 percent for ground- and surface-water quality, 3 percent for sediment, and 8 percent for water-use (see figure 2).

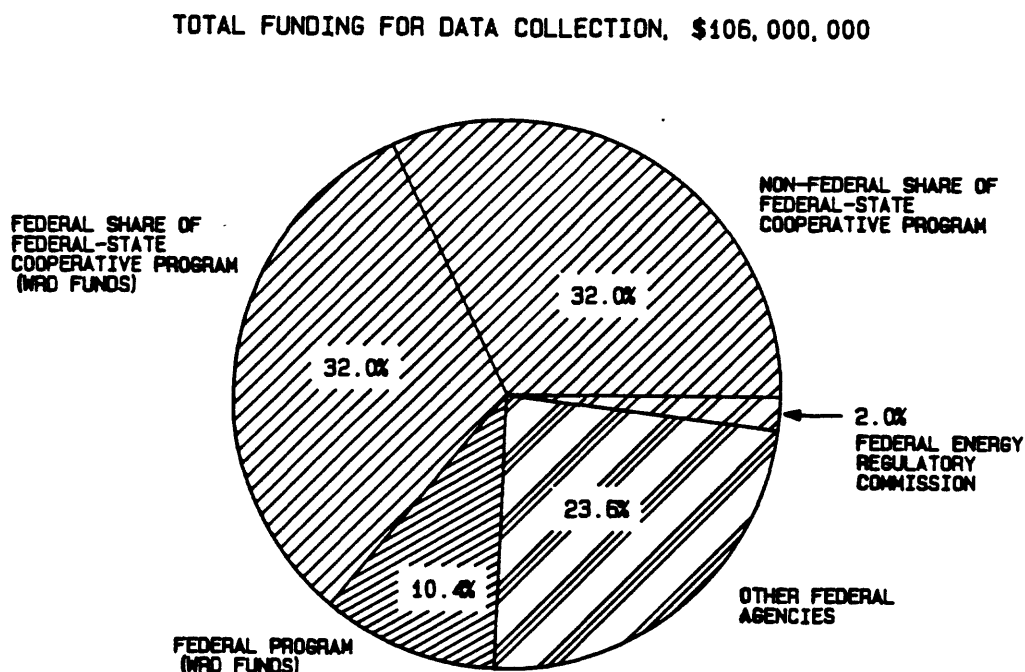


Figure 1. Sources of funds for hydrologic data collection, fiscal year 1988

TOTAL FUNDING FOR FY 1988, \$106,000,000

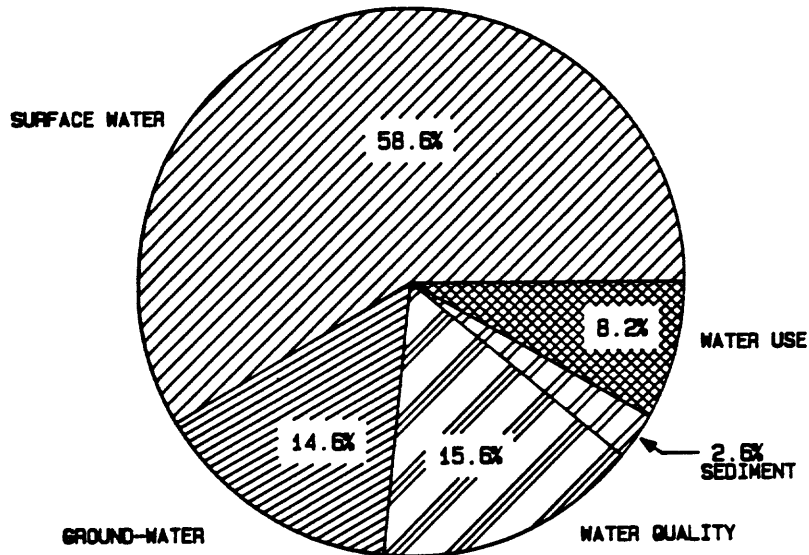


Figure 2. Distribution of funds for hydrologic data collection, fiscal year 1988.

The USGS is by no means the only Federal agency involved in collection of hydrologic data. Most notably, the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers collect sizable amounts of hydrologic data. In addition, a number of States, cities, and local government agencies collect hydrologic data. The data networks operated by these other agencies and by USGS are complementary; the primary differences in the USGS networks and the other agency networks is the purpose for which the data are collected. USGS data generally are collected to address problems of national and regional scope. As such, the data are used for a variety of purposes, including the following:

- o To characterize current condition of water resources (both quantity and quality).
- o To resolve interstate conflicts.
- o To define the water resources at our international borders.
- o To meet the needs of other agencies in managing and regulating the nation's rivers and streams.
- o To enhance the public safety (for example, to provide data for flood forecasting).

Data collected by other agencies, whether they are Federal, State, or local, generally are aimed at fulfilling a specific mission or task. For example, a great deal of data are collected to fulfill permitting requirements associated with waste water or treated water (Hren and others, 1984, and Childress and others, 1989). These data, while vital for that specific mission, generally have little transfer value and are, consequently, of limited value in addressing issues of national and regional scope.

The hydrologic-data network of the WRD, however, does not represent a single "network" of streamflow stations. The hydrologic-data network is actually an amalgamation of networks and individual streamflow stations that may have been originally established for other purposes. Funding of the WRD "network" also represents an amalgamation; funding for individual stations in the network may come from a blend of non-Federal and Federal funds (the Cooperative Program), from direct appropriations to USGS, or from other Federal agencies.

Program Functions Analyzed

This feasibility study considers only the WRD's hydrologic data-collection and analysis program. The data program consists of many individual elements and tasks, ranging from maintenance of structures that house data-collection equipment to developing and testing specialized equipment needed to collect hydrologic data. For the purposes of this feasibility study, these elements have been categorized into one of the six functions described below.

Onsite data collection--Includes the operation and maintenance of stage-measuring stations on rivers, lakes, and reservoirs; measuring stream discharge; measuring ground-water levels in wells; collecting water samples from both surface- and ground-water; onsite analysis for specific water-quality properties and constituents; and operating and maintaining precise hydrologic measuring and sensing equipment, including continuous water-quality sensors.

Office analysis--Includes steps needed to convert data collected in the field to the finished products published in the USGS's annual Water-Data Reports. These steps include, but are not limited to, processing surface-water stage data and measurements to determine discharges; preparing written analyses of how the data were determined; analyzing laboratory results; entering data into computer files; preparing tables of data and manuscripts for the annual data reports; and disseminating information in response to current requests by users who require special analysis. Quality control and quality assurance are performed to ensure an accurate product.

Laboratory analysis--Includes analysis of water and sediment samples for properties, inorganic and organic constituents, and radionuclides. Analytical requirements for individual samples may range from relatively simple analyses, such as determining the concentration of dissolved solids, to sophisticated analyses for toxic organic compounds.

Publication and distribution--Includes the preparation of camera-ready copy of hydrologic-data tables and manuscript for each hydrologic station, assembling and organizing the tables into the annual data reports, and printing and distributing the reports to users.

Equipment procurement and supply--Includes procuring, testing, and supplying the specialized equipment necessary to collect and analyze hydrologic data. In addition, the supply component requires maintaining an inventory from which orders can be filled.

Construction and maintenance--The WRD collects hydrologic data from about 50,000 different locations across the Nation. At many of these, structures must be built to protect the hydrologic equipment, to stabilize streams, or to provide a means for making measurements during floods. For example, each of the about 7,000 continuous-record streamflow stations requires construction and maintenance of a shelter to house the equipment and a water-intake system or other means of sensing river stage. Also, a cableway that spans the river may be required for measuring flows when the streams cannot be waded; about 1,700 cableways presently are in use at these gaging stations. The structures and appurtenances are exposed to the elements and require continual maintenance and periodic rehabilitation.

Full Time Equivalents (FTE)

One of the difficulties in counting the numbers of full-time employees involved in the specified functions of hydrologic data collection and analysis in the WRD is that few persons work exclusively on one function. In fact, many employees that work on hydrologic data collection and analysis also work on other WRD programs. Thus, the concept of Full Time Equivalents (FTE) is used to account for the persons working on the functions of the hydrologic data program under investigation. One FTE represents 2,080 person-hours per year.

The current (1989) number of data-program related FTE (1,417) were defined by polling the District offices of the WRD; the Branch of Analytical Services (BAS) laboratory in Arvada, Colorado; and the Hydrologic Instrumentation Facility (HIF) at Bay St. Louis, Mississippi. The results are tabulated in table 1, and the percentage distribution by function is shown in figure 3.

The majority of FTE, 1,041 or 73.5 percent of the total, are involved in the onsite data-collection and data-analysis functions. Although these are identified as separate functions, experience has shown they are best treated as joint functions. Persons that have a sound understanding of field procedures are better able to convert data collected onsite into publishable values; conversely, those persons with a good understanding of the requirements in office analysis are generally among the best collectors of onsite data.

Table 1. Number of full time equivalents (FTE) involved in the WRD's hydrologic data collection and analysis program, distributed by function.

Function	FTE	Percent of total FTE
Onsite data collection	422	29.8
Office analysis	619	43.7
Laboratory analysis	147	10.4
Publication and distribution	59	4.1
Equipment procurement and supply	50	3.5
Construction and maintenance	120	8.5
Total	1,417	100.0

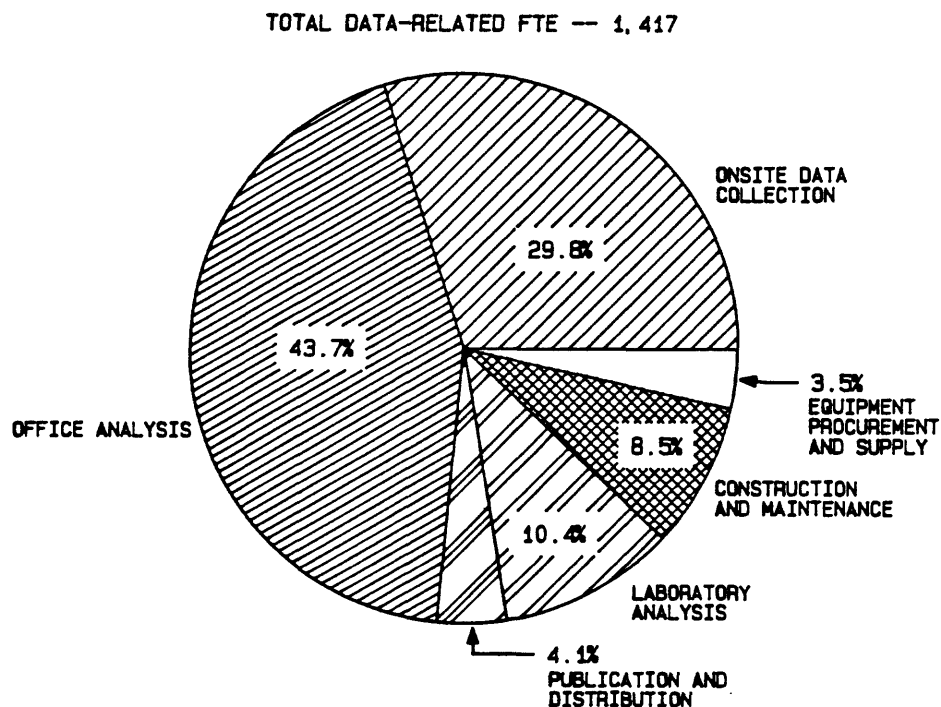


Figure 3. Data program related FTE, by function.

The laboratory analysis function of WRD involves about 147 FTE, or about 10 percent of the total. About 100 of the FTE are located at the laboratory in Arvada, Colorado. The Arvada facility serves as a centralized laboratory to WRD and serves both the data program and the WRD's research program. No attempt has been made to separate the FTE associated with analyses for research-related work from those associated with data-related work.

However, based on the budget alone, about 20 percent of the effort (and people) would be devoted to research-related analyses. The remaining 47 laboratory-related FTE are distributed among the offices of WRD. Several WRD Districts have small laboratories. Among those are Alaska, Florida, Iowa, Louisiana, New Mexico, Puerto Rico, and Pennsylvania. Several of these laboratories focus on sediment work, which is not done by the central laboratory in Arvada. Few of these District laboratories involve more than 2 or 3 persons. The remainder of the FTE actually represent fractional FTE spent preparing samples for shipment to or receiving results from one of the other laboratories.

Only 59 FTE are associated with the publication and distribution function. These 59 FTE are distributed among the 50 States and Puerto Rico; in all except the largest States (for example, New York or Texas) the publication and distribution function actually involves less than a full FTE.

The equipment procurement and supply function involves about 50 FTE, all of which are located at the HIF. Among the services performed by the HIF are: test and evaluation of new equipment; operation of a warehouse to supply equipment to field offices; preparation of specifications for contracts; supervision and administration of equipment-service and repair contracts; and serving as a service center for repair of defective equipment. However, most repair work is done by contract.

The construction and maintenance function involves about 120 FTE that are widely distributed across the breadth of the WRD's operating area. The amount of construction, and the related FTE, varies from year-to-year and State-to-State depending on changes in the hydrologic-data program. Maintenance, however, is relatively constant and depends largely on the number of data-collection sites.

PRIVATIZATION IN THE WATER RESOURCES DIVISION

Present Status

The current level of privatization in the WRD is significant. The WRD procures goods and services from non-Federal sources using contracts, grants, and cooperative agreements. Procurement of goods and services by the WRD has increased from \$27 million in FY 1982, to \$65 million in FY 1988 (figure 4). This increase in procurement exceeds the corresponding growth of the WRD program. These dollar amounts represented 14.5 percent of the total WRD program funding in 1982 and 23.3 percent of the total WRD program funds available in 1988. Because total WRD program funds include State and local funds offered under the Cooperative Program and reimbursement from other Federal agencies, the \$65 million represents 43.5 percent of the funding appropriated by the Congress to the WRD for FY 1988 (figure 5).

In FY 1988, contracts for services made up 40 percent of the \$65 million; purchases of equipment, 23 percent; purchase of supplies, 19 percent; grants, 16 percent; and purchase of furniture, 2 percent.

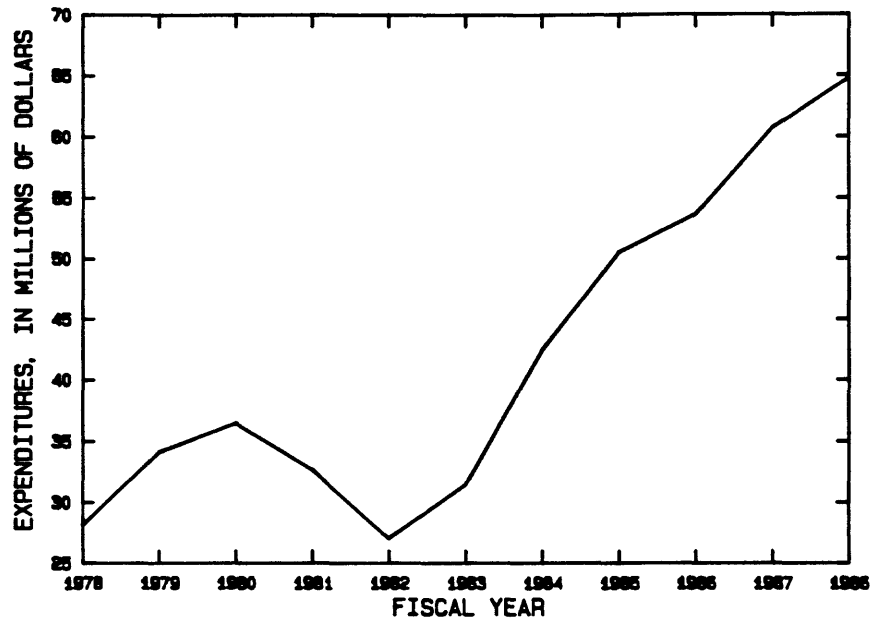


Figure 4. WRD procurement expenditures for fiscal years 1978-88.

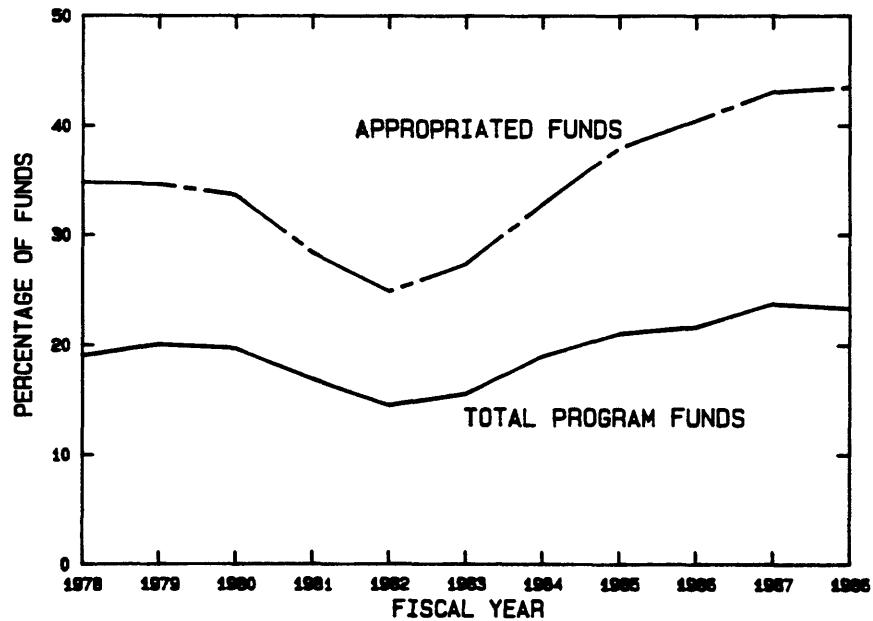


Figure 5. WRD procurement funding as a percent of total WRD program funds and WRD appropriated funds, fiscal years 1978-88.

The WRD also uses another form of privatization--using the services of State agencies to help accomplish the WRD mission. Credit is allowed for services provided by the State agencies under the WRD's Federal-State Cooperative Program. Under the Cooperative Program, States and local agencies are required to provide at least 50 percent of the funding. The non-Federal part of the 50-50 matching requirement can be the sum of cash payments and credit allowed the cooperator for services provided in direct support of the program. Such credits internally are called Direct Services or Direct Expenditures; the WRD policy on Direct Expenditure credits is summarized in Appendix A. In the current fiscal year (1989), the WRD is recognizing about \$7.2 million in Direct Services credits in the data-collection and analysis programs (table 2). Almost one-half of the Direct Services are for the collection of water-use data. The use of Direct Services in data-collection and analysis programs increased from about \$1.3 million in FY 1981 to \$8.3 million FY 1988 (figure 6).

Table 2. Distribution of Direct Services by data-collection project and by function, fiscal year 1989

Function	Data-Collection Project					Total funds
	Surface water	Ground water	Water quality	Sediment	Water use	
Onsite data Collection	\$827,344	\$891,177	\$133,550	\$18,100	\$1,222,750	\$3,092,921
Office Analysis	455,375	256,494	53,750	3,700	1,295,760	2,065,079
Publication and distribution	44,670	38,592	10,500	1,100	262,880	357,742
Laboratory analysis	0	31,000	458,445	100	0	489,545
Equipment procurement and supply	8,000	4,000	13,100	0	0	25,100
Construction and maintenance	125,220	85,600	1,100	0	0	211,920
Other	333,665	217,600	81,500	10,000	329,500	972,265
Totals	\$1,794,274	\$1,524,463	\$751,945	\$33,000	\$3,110,890	\$7,214,572

The States and the USGS have worked together for about 60 years to optimize the data-collection and analysis program. Careful control is exercised over the use of Direct Services to ensure maximum benefit to water-data users. The Direct Services credits are used where the services enhance the reliability and accuracy of the data collected. Well drilling, for example, may be credited as Direct Services where information is needed on the ground-water characteristics of an area and the State has appropriate drilling capability. The State may be asked or may offer to provide the well drilling for Direct Service credit.

Examples

This section presents examples that illustrate the WRD's use of privatization. The first two examples illustrate privatization that has taken place in the onsite data-collection and office analysis functions. The third example reviews a current contract for laboratory analyses. The final example reviews a pilot effort to contract for routine maintenance at streamgaging stations. Examples of privatization for the publication and distribution function and the equipment procurement and supply function are given under the "Analysis of Feasibility" section of this report.

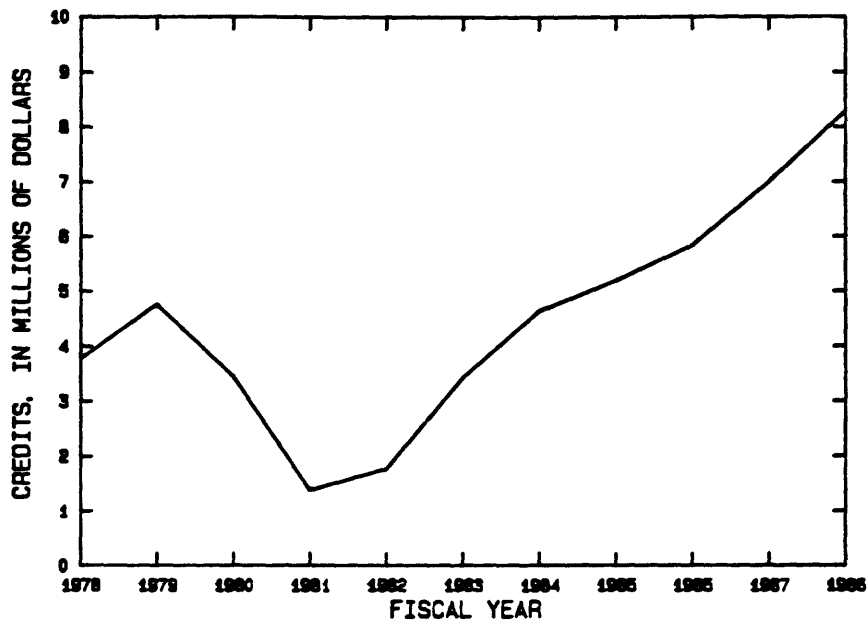


Figure 6. Direct services credits associated with data collection for fiscal years 1978-88.

Coal-Area Study

In fiscal year 1977, the Congress appropriated \$1.8 million to the USGS to acquire hydrologic data in the major coal-lease areas of Montana, North Dakota, Wyoming, Utah, New Mexico, and Oklahoma. Existing hydrologic data were sparse in the coal-deposit areas, and additional data were needed to manage the Federal coal-leasing program. Several factors made the WRD consider contracting. Data were needed over a six-State area, but in a given State, the data needs were confined to the vicinity of the coal deposits. Thus, the work could be (and was, in fact) awarded in several contracts dealing with specific localities. Also, the need for data was immediate, but personnel ceilings could not be adjusted rapidly. Therefore, the decision was made to contract for the data collection.

Contracts were awarded, and data collection began in water year 1978. In 1981, however, the Congress drastically reduced the funds for this program, and the contracts were terminated. A retrospective assessment of the contracting effort and a comparative cost analysis was reported by Kilpatrick and others (1983). The report by Kilpatrick and others (1983) discusses all aspects of this effort in some detail; the following is a brief synopsis of that report.

Hydrologic data needed included measurements of:

- o surface-water quantity,
- o surface-water quality,
- o surface-water sediment,
- o ground-water levels,
- o ground-water quality,
- o surface-water gain/loss of discharge and water quality, and
- o precipitation measurements.

The work covered a large area--so large that small contractors would have been discouraged from participating if the work had not been made available in smaller work units (see Figure 7). Therefore, the work was divided in several units. Contracts were originally awarded to two firms; one was a regional firm, the other was multi-national. However, in the final contract year, one firm held all of the contracts. The actual breakdown of the work by States and years is tabulated in Appendix B.

The WRD has extensive experience and competence in the acquisition and analysis of hydrologic data. Therefore, maintaining data quality in a contractor-operated data-collection program was a major concern. The following measures were taken to assure quality control:

1. Detailed specifications were prepared that clearly defined the work and the techniques and standards to be used.
2. A training program was established for contractor personnel. Both formal and on-the-job training were provided on WRD procedures for data collection and analysis.
3. WRD hydrologic measuring equipment and instrumentation were supplied to the contractor.
4. Check measurements were made and stations were inspected by WRD field hydrologists.
5. Close coordination was maintained between WRD hydrologists and the contractor who analyzed and processed the data.

The variability of, and the uncertainty associated with, the occurrence of hydrologic phenomena create difficulty in preparing specifications for hydrologic data collection. The types and frequency of the data to be collected must be specified. However, the amount and types of data to be collected during hydrologic extremes are virtually impossible to define exactly in advance of the event. The specifications for the collection and processing of hydrologic data in Oklahoma are presented by Kilpatrick and others (1983). Those specifications go into considerable detail regarding the required methods and techniques. Monthly work schedules and quarterly progress reports were required. Qualification requirements of the contractors' personnel were also defined.

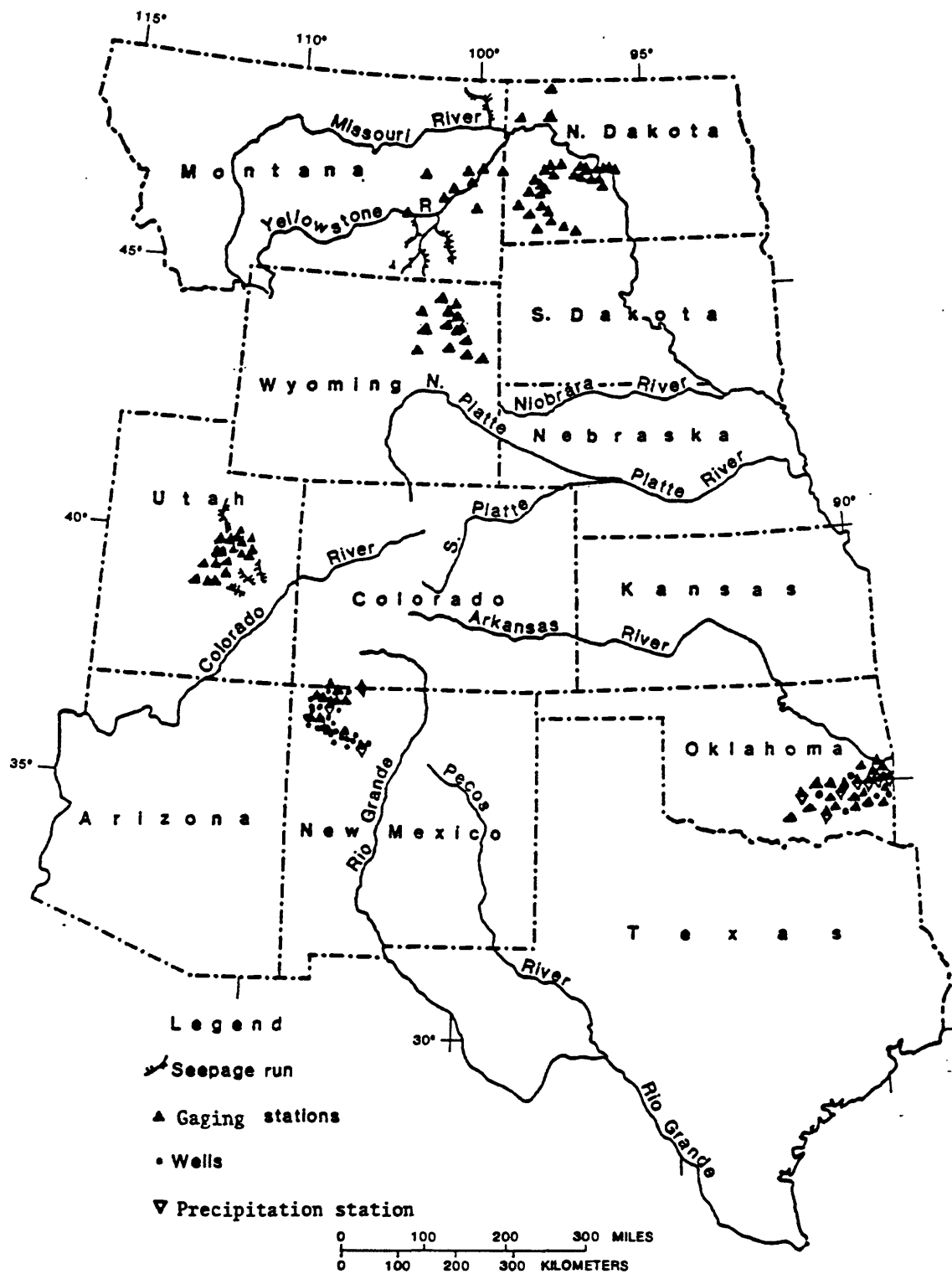


Figure 7. Locations of contract hydrologic data-collection stations (from Kilpatrick and others, 1983, p. 3).

Numerous new gaging stations were installed as a result of this program. These were constructed prior to being turned over to the contractors, but were not instrumented. Instruments were installed jointly by WRD and contractor personnel as a part of the on-the-job training. At the same time, field training was provided on the WRD techniques for making discharge and water-quality measurements. Followup training was provided during routine inspection trips.

A negotiated contract was used instead of a formally advertised contract. The evaluation criteria were stated in the solicitation, and potential contractors were asked to address their qualifications and experience to the stated criteria.

After the termination of the contract, a retrospective analysis was made to compare the costs of data acquisition under the contracts with the estimated costs assuming WRD had collected the data. The comparison was based on the same scope of work and included all identifiable costs. Operational costs of the WRD for laboratory analyses, computer services, and manuscript publication were excluded from the cost comparison because those activities were beyond the scope of the contracts. Start-up costs were also excluded because they were for reusable products (specifications and equipment). The start-up costs excluded from the cost comparison were the costs of:

- o Preparation of contract documents and selection of contractors.
- o Technical equipment provided to contractor, including shipping.
- o Construction of gaging stations.
- o Orientation and initial training of contractor's staff.

In general, the work performed by the contractors was satisfactory. The emphasis placed on quality control and the close cooperation of the contractor and WRD personnel at the field level led to the collection of acceptable hydrologic data. Total cost of the contract for the 4-year effort was approximately \$4 million; \$2.8 million was awarded to contractors for the collection and analysis of hydrologic data in the six-State area. Approximately \$1.2 million, or 30 percent, went to contract monitoring and quality-control measures. Contract costs for hydrologic data acquisition during fiscal years 1978-81 were estimated to have been about 55 percent greater than the cost of performing the same work using WRD personnel (Kilpatrick and others, 1983, p. 16).

A significant portion of the USGS quality control is accomplished through day-to-day interaction between supervisors and those collecting the data. In the absence of such day-to-day supervisory contact, a greater effort is required to ensure that proper techniques and procedures were used throughout the data-collection process.

National Water-Use Information Program

Estimates of water use in the United States have been published at 5-year intervals by WRD since 1950. Before the National Water-Use Information Program began, estimates of water use were derived from many sources and were based on a variety of methods of data collection and analysis that

differed in accuracy. Therefore, the available information fell short of providing a data base that was current, readily accessible, and reliable. Without adequate information on the amount of water used, where it is used, and how it is used, planners and managers cannot resolve many critical water problems involving resource allocations, environmental impact, energy development, and water quality.

The WRD contracted with Environmental Control, Inc. in 1972 to develop a program plan to provide for more consistent and standardized water-use information for the Nation. The resulting report, "The Development of a Procedure for Acquiring and Disseminating Information on Water Use" (Environmental Control, Inc., 1972) documented the need for a consistent and standardized data acquisition, management, and dissemination program for water-use information and served as the foundation for the National Water-Use Information Program.

In FY 1978, the WRD included the proposed water-use program in their budget proposal and received a \$1.0 million appropriation in the Federal-State Cooperative Program to begin the National Water-Use Information Program. The program was designed to collect, store, and disseminate water-use information both nationally and locally. Because most of the water-use data were collected by State agencies, and that responsibility traditionally was with the States, the program was designed so that data acquisition was carried on by the State cooperator's staff. The WRD provided guidance and direction to the program; devised and applied new methods and techniques to improve the collection, analysis, and dissemination of water-use information; developed new water-use instrumentation; and developed and refined a computerized system to store and retrieve the water-use information. The program has expanded to all 50 States and Puerto Rico, and funding has steadily increased to nearly \$8 million in FY 1989.

Initially, the Water-Use Program utilized "reverse-flow funding" to transfer Federal cooperative money to the State cooperators, as well as recognizing the States' share of the costs as Direct Services credits. A few years into the program, the WRD realized the need to have its own hydrologists become more involved and familiar with the water-use data being collected by the States in order to develop in-house expertise and to integrate the water-use information with other project activities. These needs, and the tightening of the budget in FY 1982, caused the WRD to begin reducing the "reverse-flow funding" going to the State cooperators. This funding mechanism was completely eliminated by the end of FY 1983. However, Direct Services by State agencies for water-use data collection amounted to over \$3 million in FY 1989.

With the elimination of reverse-flow funding, the Districts assumed a greater role in water use, not so much from the data collection standpoint, which is still largely done by State cooperators, but from the data management, interpretation and analysis, and data coordination standpoint. The local water-use information is now integrated into a viable national water-use data base. The data have also been integrated with other WRD program activities to complement data on water quantity and quality. With better water-use expertise in-house, the WRD is better able to evaluate

water-use information provided by other agencies and to provide assistance in data compilation and data management, quality assurance, data sampling techniques, and in estimating projected water-use.

The present mix of activities between cooperator and WRD personnel is well balanced and provides an excellent opportunity for cooperative efforts to accomplish the goals and objectives of the National Water-Use Program from the local, State, and national levels.

Laboratory Services

The WRD currently has a contract with a private laboratory to perform laboratory analyses of organic and inorganic constituents in water and soil samples. The analytical results of these samples are used to support investigations of sites located throughout the United States, with particular emphasis on Air Force military bases. Environmental Protection Agency (EPA) procedures and protocols, including chain-of-custody procedures and data reporting needs, are used in the contract. This annual contract was initiated in February of 1987 and includes two option years ending in February 1990. In the first year (February 1987 to February 1988), the dollar amount of the contract was \$267,500. During the first option year (February 1988 to February 1989) the total dollar amount contracted was \$1,136,000. The second option year (February 1989 to February 1990) was exercised, and the estimated contractual amount for this year is \$1,500,000. Total funding over the life of the contract is approximately \$2,900,000.

The water and soil samples analyzed under the contract are collected by WRD personnel. The WRD laboratory system logs the samples and assigns an identification number prior to sending the samples to the contractor. That identification number is retained and used in all records pertaining to the sample by the contractor. In addition to the WRD log-in number, each sample is accompanied by a worksheet identifying the determinations to be performed on the sample. The contractor must maintain strict chain-of-custody procedures to ensure accountability of the samples and the data.

The contract requires that the contractor be certified by the EPA to analyze water and waste-water samples. The contractor is also required to have sufficient analytical instrumentation in-house to meet all of the terms and conditions of the contract. Instrument redundancy must be sufficient to ensure that at least one operating unit will be available at any time.

Samples are analyzed in order of receipt, and the data are returned within 25 days of the time of receipt of the sample. Every week, the contractor must submit a letter that includes: A tabulation of the samples received, sample number, laboratory identification number, date of receipt, and any comments concerning the condition of the samples or problems encountered.

The sample solutions remaining after completion of analysis are stored by the contractor following submission of the analytical results to the WRD. Reanalysis at contractor expense may be required by the WRD on a maximum of 5 percent of the reported values. After 60 days, both the solution and the sample container are disposed of properly. The contractor must establish

and maintain a system of security and safeguarding to prevent analytical data, which is Government property, from being released to unauthorized persons.

The contractor is required to participate in the Standard Reference Water Supply Program conducted by WRD and the Water-Supply and Water-Pollution Performance-Evaluation Studies sponsored by the EPA. A copy of the report concerning these samples is submitted within 1 week after receipt by the contractor from the sponsoring agency. About 15 percent of the samples delivered to the contractor are quality assurance samples such as field blanks, standard reference material, spiked, or duplicate samples. The validity of results of these samples is monitored closely.

The contracting officer is located at the Arvada laboratory and maintains close contact with the contractor. In addition, the contractor has been issued a user identification on the WRD's computer network to facilitate electronic-mail messages between the contract laboratory and the WRD laboratory. This contract has successfully provided analyses with unusually strict requirements that would have required large capital cost improvements in the current WRD laboratory facilities. Use of the contract laboratory meant that WRD did not have to establish analytical procedures required by Superfund sites; WRD normally does not follow the chain-of-custody requirements needed for those analyses.

New York Gaging Station Maintenance

Rehabilitation and maintenance of hydrologic-data stations are carried on as a continuing part-time function of the technical personnel who collect and analyze the data. The New York District has undertaken a pilot program of hiring contractors to do the routine summer-time maintenance. The contractor furnishes the personnel, equipment, facilities, and materials necessary to provide maintenance at approximately 20 gaging stations in central and western New York State. The geographic location of the gaging stations are divided into three areas with relatively equal numbers of gaging stations and cableways.

The maintenance contracts seem to be working in New York. However, in some areas this will not be possible because of the cost involved in accessing remote sites. At these sites, the maintenance visit must be combined with the data-collection visit to be economically feasible. Other Districts have been encouraged to determine the feasibility of using the private sector in rehabilitating and maintaining their gaging stations, relieving WRD technical personnel to perform more critical technical work.

ANALYSIS OF FEASIBILITY

In attempting to assess the potential for privatization of the WRD data-collection and analysis program, the individual functions were screened against the OMB Circular A-76 definitions of governmental functions. For the purposes of this feasibility study, the following criteria were used in assessing whether a function meets one or more of the generic, governmental categories and would, therefore, be exempt from coverage in this analysis (Office of Management Improvement, written commun., April 20, 1989):

- o Does the function involve a high order of discretion in interpreting rules, regulations, legal opinions or policy, in deciding a course of action, or in rendering a decision or judgement that affects an administrative or program area?
- o Does the function involve advocating or supporting policy decisions to the public?
- o Is the function responsible for deciding how a program will be implemented, how priorities will be set, what will be emphasized/de-emphasized, or what direction the program will take?
- o Does the function involve contract development, contract negotiating, contract administration, contract oversight or quality control of contract deliverables?
- o Does the function involve making discretionary judgement or decisions in the management, protection, or enhancement of natural resources?
- o Does the function involve developing rules, regulations, or policy?
- o Is the function involved in the conduct of research and development, which is exempt, or is it a support function? If a support function, does it assist in the conduct of research and development in such a manner that it is not reasonably severable?

Results of screening the functions against the above definitions showed that decisions must be made in the field in response to changing hydrologic conditions if the critical data are to be collected. Professional hydrologists and hydrologic technicians share the responsibility for assuring that data collection is conducted in accordance with the most current technology and program priorities. These employees are the first line of quality assurance for the USGS's hydrologic activities through their knowledge of data-collection techniques, analytical methods, and sophisticated instrumentation. Hydrologic data are time dependent; data that are not collected when the event occurs cannot be reproduced in the future. Many of the USGS data-collection sites are in rural areas with no nearby access to telephones. Employees, who more often than not work alone, must therefore render decisions that directly affect the program, its priorities and content, and the quality of its information products. These decisions are value judgements. In addition, several of the functions involved significant amounts of contract development, negotiation, oversight, or quality control of contract deliverables. Functions most notable in that regard are the specialized laboratory analysis function, the equipment procurement and supply function, and the printing and distribution function.

The ultimate determination of whether the onsite data-collection and office-analysis functions are governmental is dependent on the need for and uses of the data. The question really can be paraphrased as follows: What is required on a national scale to collect hydrologic data on the quantity and quality of surface water, on the quantity and quality of ground water, or on the use of water?

In attempting to evaluate the Government role in the various functions defined for this study, the functions of onsite data collection and office analysis, which account for about 74 percent of the FTE, need to be evaluated simultaneously. The following discussion, therefore, does not attempt to separate collection from analysis.

Onsite Data Collection and Office Analysis

Surface-Water-Quantity Data

The WRD began an evaluation of the continuous-record surface-water network in 1983. The objective of the network evaluation was to define and document the most cost-effective means of obtaining and providing streamflow information. The study was done in three phases: In the first phase of the analysis, the principal uses of the data were defined for individual gages, and those uses were related to funding sources. In addition, the gaging stations were categorized as to the timing of the availability of data. The second phase of the analysis was intended to identify less costly alternative methods of obtaining and providing the needed data, and the third and final phase of the analysis involved the use of Kalman-filtering and mathematical programming techniques to define strategies for operation of the needed stations. A pilot study was done for Maine (Fontaine and others, 1984), and separate reports were prepared for individual States. Reports resulting from this nationwide effort are listed in Appendix C. The results of the first phase of the network evaluation study have direct application to this study, in that the uses of data at existing streamflow stations are defined.

The uses of data from individual streamflow stations were identified through a survey of known data users. Data uses identified by the survey were categorized into nine classes, defined below. The classes of use were not mutually exclusive--theoretically, a streamflow station could have been identified for use in all of the categories. The following definitions were used to categorize the known uses of streamflow data:

Regional Hydrology--For data to be useful in defining regional hydrology, a stream gage must be largely unaffected by manmade storage or diversion. These stations are useful in developing regionally transferable information about the relationship between basin characteristics and streamflow.

Hydrologic Systems--Stations that can be used for accounting, that is, to define current hydrologic conditions and the sources, sinks, and fluxes of water through hydrologic systems including regulated systems, are designated as hydrologic systems stations. They include diversions and return flows and stations that are useful for defining the interaction of water systems.

Legal Obligations--This category contains only those stations that the USGS is required to operate to satisfy a legal responsibility, such as those needed for treaties, compacts, and decrees.

Planning and Design--Gaging stations in this category of data use are used for the planning and design of a specific project.

Project Operation--Gaging stations in this category are used, on an ongoing basis, to assist water managers in making operational decisions concerning such things as reservoir releases, hydropower operations, or diversions.

Hydrologic Forecasts--Gaging stations in this category are regularly used to provide information for hydrologic forecasting by agencies other than the USGS.

Water-Quality Monitoring--Gaging stations where regular water-quality or sediment-transport monitoring is being conducted and where the availability of streamflow data is essential to the interpretation of the water-quality or sediment data. Stations operated as part of the National Stream-Quality Accounting Network (NASQAN) are included in this category.

Research--Gaging stations in this category are operated for a particular research or water-investigations study.

Other--This category contains those data uses that did not fit any of the eight categories above.

Scott and Moss (1986) published an interim summary of the 1983-88 network evaluation; in 1986, however, the evaluation was only slightly over one half complete. At the present (1989), over 6,000 of the approximately 7,000 continuous streamflow records have been evaluated. The data presented in this feasibility study update the information presented by Scott and Moss (1986).

Table 3 summarizes the data uses from 6,238 continuous-record streamflow stations surveyed in the 1983-88 network evaluation. The table shows both the number of stations and percentage of total stations identified with individual classes of data use. These data are also shown in figure 8. More than 50 percent of the stations evaluated are used to define regional hydrology and about 57 percent are used to define hydrologic systems. Both of these categories of use are important in attempting to address issues of national and regional scope. Almost 40 percent of the stations are used in hydrologic forecasting; virtually all of this use is by the National Weather Service in their flood-forecasting system. About 37 percent of the stations are required to provide ancillary streamflow data needed at water-quality monitoring sites.

While table 3 shows that the average station is used for 2.6 of the data-use categories, it does not show how many stations have a specified number of uses. Those data are given in table 4 and figure 9. As shown by figure 9, only 20 percent of the gages have only a single use identified for the data. Fifty percent of the gages have three or more uses of the data. Those stations with only a single use were further evaluated to define how many of the gages were included in the individual data-use categories. The results (see figure 10) show that 65 percent of the gages having a single use are used for either regional hydrology or to define hydrologic systems.

Table 3. Summary of data uses for continuous-record streamflow stations surveyed in the 1983-88 surface-water network evaluation

<u>Class of data use</u>	<u>Number of stations</u>	<u>Percentage of total stations</u>
Regional Hydrology	3,227	51.7
Hydrologic Systems	3,564	57.1
Legal Obligations	238	3.8
Planning and Design	938	15.0
Project Operation	2,447	39.2
Hydrologic Forecasting	2,437	39.1
Water Quality	2,307	37.0
Research	603	9.7
Other	609	9.8
Total uses	¹ 16,370	
Total stations classified	6,238	

¹The average station is used for 2.6 data uses.

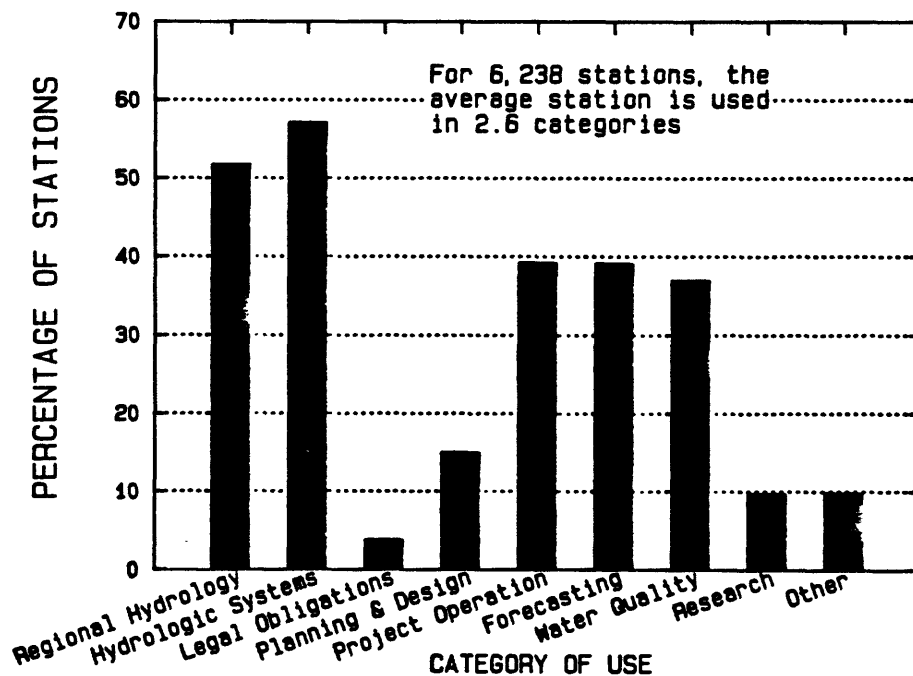


Figure 8. Percentage of stations by category of use.

Table 4. Number of streamflow stations with the indicated number of uses for the data.

Number of Uses	Stations	Percent of Stations
1	1,252	20.1
2	1,857	29.8
3	1,586	25.4
4	977	15.7
5	422	6.8
6	120	1.9
7	22	0.3
8	2	0.0
9	0	0.0
Total	6,238	100.0

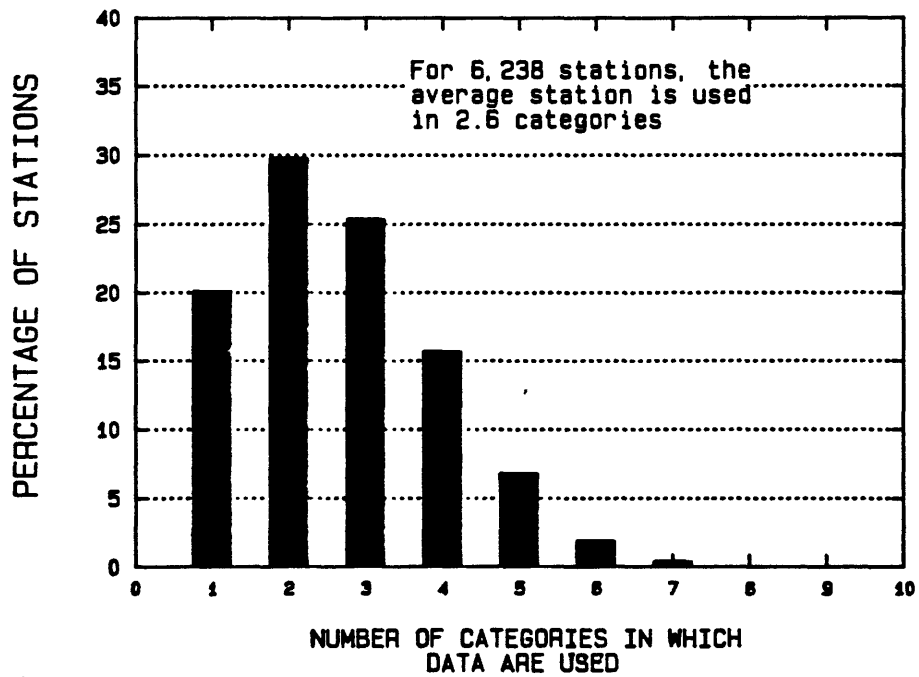


Figure 9. Percentage of stations versus numbers of use categories.

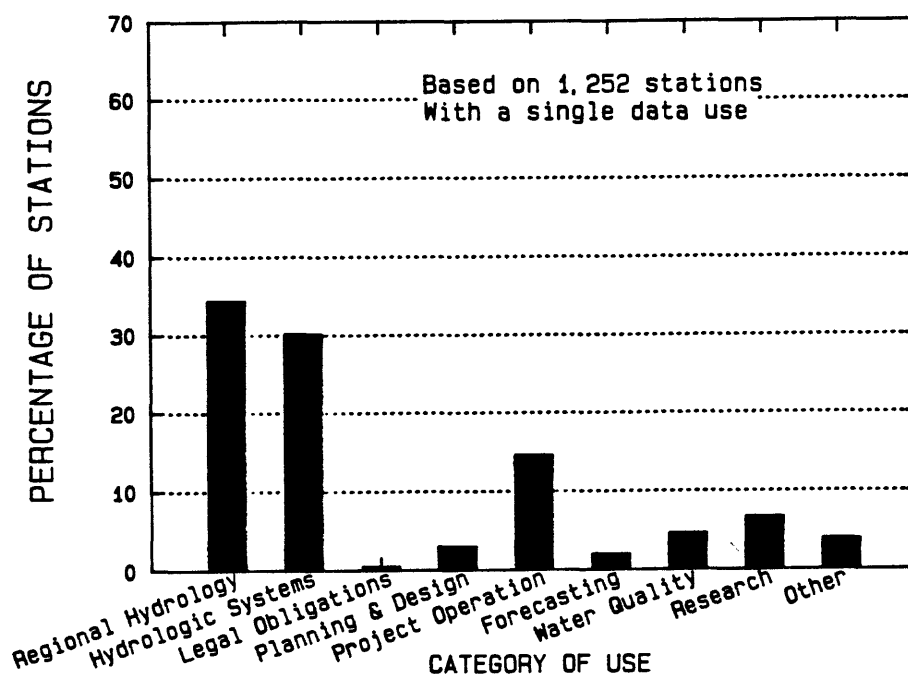


Figure 10. Percentage of single-purpose stations by category of use.

The foregoing summary shows that the data collected by the WRD have multiple uses and are important in attempting to address issues of national and regional scope. This in itself, however, would not preclude privatization of the data collection and analysis. It does demonstrate, however, that the importance of the data would dictate that stringent quality control procedures continue to be invoked in the operation of these streamgaging stations. This would essentially require that a shadow program be operated for the purposes of quality assurance. Based on the evaluation presented by Kilpatrick and others (1983) and by R.L. Walker & Partners and Acres Limited (1985), it is very likely that the cost of operating the stations while operating a shadow program for quality assurance would force costs to be higher than they are at present.

Data for about 750 continuous-record daily-discharge stations (about 10 percent of all stations) published and archived by WRD are records furnished by other agencies. The bulk of these data are collected by State agencies under the Cooperative Program. California, Colorado, Nebraska, Nevada, Virginia, and Wyoming are six States with active stream-gaging programs. These States work closely with the WRD in collection of these data, and rely on WRD specialists for review prior to publication. However, excepting water-quality data collected to satisfy specific purposes, only about 25 percent of the States operate significant numbers of hydrologic data-collection stations (Office of Water Data Coordination, 1981). It is unlikely that States not presently collecting significant amounts of hydrologic data would develop that capability in the near future.

Ground-Water-Quantity Data

The WRD is involved in the collection of water-level data for approximately 32,000 ground water wells each year. Nearly 10,000 of those wells are measured in conjunction with short-term interpretive studies. The remaining 22,000 are part of the continuing, long-term data-collection program of the WRD. Over 75 percent of the 22,000 basic data wells are funded through the Federal-State Cooperative Program; fewer than 1,000 are funded solely through the Federal program. Responsibility for collecting ground-water data usually is shared by State agencies and the WRD. Most States are actively involved in at least some fraction of the onsite data-collection function. Usually, States receive credit for Direct Services in return for their field activities.

The extent of State involvement in ground-water data collection varies considerably from State to State. In some States, water levels for all of the basic-data wells are measured by State personnel. Arizona, Texas, and Nebraska are examples of States that handle all onsite data collection. Those three States alone account for over 2,000 basic-data wells, nearly 10 percent of the total nationwide. In other States, both State agencies and the WRD collect ground-water level data. Regardless of the degree of State involvement, in nearly every case the State agencies provide the WRD with their data, and the WRD assumes responsibility for reviewing, publishing, and maintaining the data on a computer data base.

The relationship between the WRD and its cooperating State agencies is different in every State and is often extremely complex. Those relationships have evolved over decades in response to local hydrologic conditions as well as to the specific political constraints that exist within each State. The programs that have resulted represent compromises that meet specific needs of the States as well as those of the WRD. Consequently, the feasibility of contracting for additional portions of the data-collection program can be evaluated only by detailed analyses of existing programs on a State-by-State basis carried out in close consultation with each of the cooperating State agencies. Such an evaluation is beyond the scope of this study.

Data on Water Quality

About one third of the WRD's 3,200 surface-water quality sites are established for investigative purposes rather than as part of a defined data-collection network. However, there have been several studies of portions of the water-quality networks that are a part of the Nationwide data-collection program. Examples of studies involving the Federally funded portions of the networks are those reported by Briggs and Ficke (1978) and Smith and others (1983) for the National Stream-Quality Accounting Network (NASQAN). NASQAN is comprised of 411 sites chosen to provide a nationally uniform basis for continuously assessing the quality of water in rivers in the United States. While NASQAN describes water-quality conditions at key points in large regions of the United States, the network is too sparse (and water-quality conditions too variable) to answer certain questions about the changing character of the quality of water resources.

Many entities presently collect water-quality data. Much of the data, however, are collected for specific purposes and are of questionable value for assessing the quality of water resources in general. Before contemplating privatization of the WRD's water-quality data-collection efforts, the role of the WRD water-quality networks in defining the quality of the Nation's water resources needs to be recognized.

In response to questions raised by the U.S. Congress about the status of the quality of the Nation's water resources, WRD conducted a pilot study of water-quality data in the States of Colorado and Ohio. The specific purposes of the pilot study were two fold: (1) To determine the characteristics of water-quality data-collection activities of Federal, regional, State, and local agencies and academic institutions; and (2) To determine how well the data from these activities, collected for various purposes and using different procedures, can be used to improve our ability to define broad scale questions about the quality of the Nation's water. The questions included the following:

1. What are the natural water-quality conditions?
2. What are the existing water-quality conditions?
3. How has water quality changed, and how do the changes relate to human activities?

Colorado and Ohio were chosen for the pilot study largely because they represent regions having different types of water-quality concerns and programs. The data for the pilot study was collected during 1984.

The study was divided into two phases. Phase I, which was reported by Hren and others (1987), inventoried the water-quality data-collection programs, including costs, and identified those programs that met the set of broad criteria for producing data that are potentially appropriate for water-quality assessments of regional and national scope. Phase II, reported by Childress and others (1989), evaluated the quality assurance of field and laboratory procedures used in producing the data that met the broad criteria of Phase I. A third phase, Phase III, is under consideration; that study would compile the qualifying data and evaluate the adequacy of the data base for addressing selected water-quality questions of regional and national scope.

In Phase I of the pilot study, an inventory was made of all public organizations and academic institutions that collected water-quality data in Colorado and Ohio in 1984. The water-quality programs identified in Phase I were tested against a set of broad screening criteria. The screening criteria used were:

1. Do the data represent ambient stream or aquifer conditions, as opposed to effluent or treated water?
2. Are the data available for public use?
3. Can the sampling sites be readily located?

4. Is quality-assurance documentation available?

5. Are the data in a computer file?

Analyses from a total of 44 water-quality programs in Colorado and 29 programs in Ohio were inventoried in Phase I. Colorado had about 240,000 analyses available, and Ohio had about 242,000 analyses available at the onset of this program. About 69 percent of the samples in Colorado and about 32 percent of the analyses in Ohio passed the Phase I screen. Those data passing the Phase I screen were passed on to Phase II and were tested against criteria dealing with field and laboratory practices. Field practices criteria for Phase II included the following:

1. Use of documented sample-collection techniques.
2. Collection of samples representative of stream or aquifer conditions.
3. Use of other established field practices.
4. Use of established sample-handling and sample-preservation techniques.
5. Use and maintenance of analytical instruments in the field in accordance with established procedures.

The laboratory practices criteria included the following:

1. Maintenance of a quality-assurance program.
2. Maintenance of laboratory quality-control procedures.
3. Use of appropriate analytical methods.

Only 11 percent of the Colorado analyses and 14 percent of the Ohio analyses passed both the Phase I and Phase II screens; of the WRD data, 98 percent passed the screens in Colorado and 97 percent passed in Ohio. A summary of the Phase II statistics is given in Appendix D. Of the individual screening criteria, that criteria associated with collection of representative samples caused the greatest reduction in usable samples in Phase II. Of the samples that passed the Phase I screen, only 18 percent of the Colorado samples and 67 percent of the Ohio samples passed the representative-sample screen.

These study results are not intended to cast doubt on the validity of the data collected by other agencies. The primary purpose of the Colorado and Ohio pilot project was to define whether the data were usable in defining the water-quality of the Nation's water resources. Much of the data collected by other agencies was collected for a specific purpose, such as to monitor point sources of potential pollutants. As a consequence, the data are not representative of ambient conditions and have limited value in answering broader questions. This underscores the importance of the water-

quality data collected by WRD. If the collection and analysis of water-quality data were privatized, stringent controls would be necessary to ensure that field and laboratory practices followed acceptable procedures. Such controls would no doubt require collection and analysis of duplicate samples.

Water Use

Field activities for acquisition of water-use data are the responsibility of the State agencies, which are given about \$3 million in Direct Services. In that sense, the program is 40 percent privatized. Direction, management, and standards that provide for a nationally consistent and comprehensive program are the responsibility of the WRD. The responsibility for disseminating raw data collected at the State level rests with each State; the aggregated data are compiled and disseminated by the WRD and the States. How these responsibilities are implemented in each State ultimately is determined by the agencies cooperating with the WRD in the program and the WRD representative in the State.

There is little impetus or opportunity for additional privatization of the water-use program. Through the Federal-State Cooperative Program, (1) State water-use data needs are met, (2) standardized collection and analysis methods allow evaluations based on similar assumptions and comparable data, (3) State Water-Use Data Systems are being developed using adaptable computer linkage and access to help assure effective, efficient communication and data handling, and (4) the data can be aggregated to respond to interstate, regional, and national water-use data needs through the National Water-Use Data System.

Laboratory Analysis

The Branch of Analytical Services (BAS) laboratory in Arvada serves as a centralized laboratory to WRD and serves both the data program and the WRD's research program. In addition to performing a full spectrum of analyses on samples submitted from WRD field offices, the BAS plays a major role in quality assurance, both for WRD laboratories and for other laboratories. The BAS contributes to quality assurance by:

- o Preparing and distributing standard reference water samples to contract laboratories,
- o Participating in the preparation and distribution of blind samples (only inorganic) to WRD laboratories and any other laboratories that wish to participate,
- o Performing qualification testing of contract laboratories,
- o Participating in the preparation of reference samples for test and calibration of field equipment,
- o Performing quality-control testing of new sample containers received from contract suppliers,

- o Performing quality-control testing of sample preservatives received from contract suppliers.

The budget for the Arvada laboratory in fiscal year 1989 was approximately \$9,000,000. About 32 percent of that amount (about \$3,000,000) was for contract services, which includes equipment rental and repair. However, about 21 percent of the budget was for contract analyses. About \$1,500,000 was contracted to one private laboratory for laboratory analyses. The bulk of this contract is for work performed for the Air Force that requires EPA procedures that are intended for Superfund sites; these procedures are not normally performed by BAS. BAS does no radionuclide analyses; those are done by contract laboratories, and BAS administers the contracts.

In addition to the contracting done by BAS, District Offices estimated that about \$2,000,000 in laboratory analyses would be performed by non-Federal laboratories in 1989. This work was distributed among 54 laboratories, including 15 private laboratories and 39 State, local, and university laboratories. These laboratories participate in qualification testing done by BAS.

Significant amounts of laboratory analyses are presently done by non-Federal laboratories, either under contract or by cooperative agreement. Some minimum level of analytical capability must be maintained within WRD in order to perform quality assurance and administer work done by contract and cooperative laboratories. Alternatives for performance of various analytical services are evaluated on a continuing basis. At this time, there is no clear cut definition of how much more, if any, privatization would be feasible.

Publication and Distribution

The publication and distribution function includes the assembly, printing, and distribution of the annual State data reports. About 70 such reports are published each year. To a large extent, this has been privatized in that all printing is done by contract. The contracts are arranged through and administered by the Government Printing Office (GPO). As a part of the contract, the reports are wrapped and prepared for distribution. Thus, WRD employees only handle the physical mailing of the reports. The WRD employees, however, assemble sheets into camera-ready copy in preparation for printing. In years past, the effort of assembling the individual sheets was FTE intensive because the manuscript that comprised the top portion of an individual page was prepared separately from the tabular data that occupies the lower portion of the page. Therefore, the two parts of the page were manually cut and spliced. At the present, the manuscripts and data are all merged electronically in computers or word processors.

Given the distributed nature of the work load and the relatively small total effort, it is difficult to see how increased privatization of this function would be cost effective. Essentially all elements of publication and distribution that might not be considered governmental functions are presently being done by contract.

Several companies in the private sector have begun marketing optical and compact disks containing data collected by WRD. The data and customized retrieval software and graphical displays are then sold to a wide variety of users. The official data base remains with WRD. These companies depend on the State data reports and the WRD historical data base for their product.

Equipment Procurement and Supply

The WRD has used procurement effectively in acquiring the instrumentation needed to accomplish its mission. An example of this can be seen in the Hydrologic Instrumentation Facility (HIF). The HIF is responsible for procuring, testing, stocking, and distributing the specialized hydrologic equipment and instrumentation needed to define the occurrence, availability, and characteristics of the nation's water resources. The HIF acts as the principal for the WRD in procuring equipment and in handling services and maintenance agreements with equipment vendors. In fiscal year 1988, for example, the HIF procurements for services and equipment purchases amounted to 70.5 percent of the total funds available to the HIF (figure 11). Whenever possible, the equipment and instrumentation is purchased from the private sector. The procurements are executed judiciously to ensure the Government a useable product that can do the job at the lowest price possible. The WRD cannot accomplish its mission if the specialized hydrologic equipment and instrumentation which it needs does not function properly. Therefore, a staff is maintained to write specifications, monitor the contract, and test the items delivered.

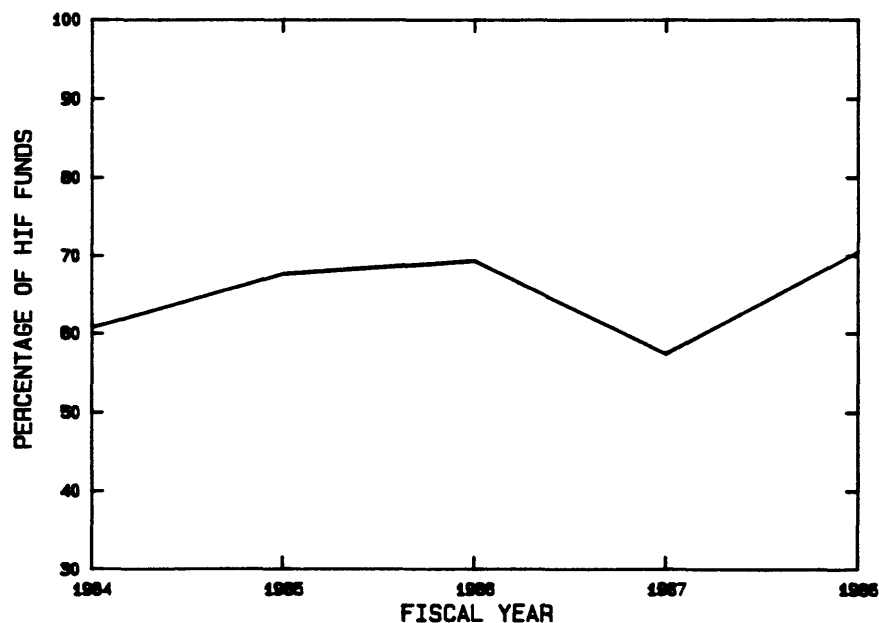


Figure 11. Percentage of Hydrologic Instrumentation Facility funds devoted to procurements, FY 1984-88.

It is unlikely that the degree of privatization can be significantly increased for the equipment development and supply function. The present emphasis at HIF is on preparation of specifications for equipment-purchase contracts, and on test and evaluation of new equipment obtained under contract. Because of the amount and complexity of equipment used by WRD, it is essential that competence be maintained to supervise and administer these contracts.

Construction and Maintenance

The construction done by the WRD generally involves building small structures (seldom larger than 5 feet by 5 feet by 8 feet), construction of cableways that span rivers, and, occasionally, the construction of low weirs or control structures (not over several feet high) in the bed of the river. Maintenance usually involves painting and refurbishing gage houses and cableway supports, clearing brush in the vicinity of the structures and cableways, and general cleaning and minor repair of equipment at the gage site. While the amount of maintenance required is relatively constant from year to year, the amount of construction needed is highly variable, both from year to year and from State to State. Construction is dependent upon whether the local program is or is not expanding. Routine maintenance often is integrated with regular measurement trips, or is performed by student help in the summer.

Presently, construction is partially privatized. The heavy equipment required to perform some construction jobs is seldom available in WRD offices; that equipment includes tractor-mounted backhoes, cranes, and large flatbed trailers. Where such equipment is required, attempts are made to either arrange for local contractors or to arrange to use cooperator's equipment and include that effort in the cooperative agreements.

This function involves about 120 FTE, which are widely and fairly evenly distributed across the breadth of our operating area. For this reason, it will be difficult to increase the amount of privatization. However, if a large amount of new construction were to be required in a fairly small area, contracting for that work might be feasible. Contracting for routine maintenance will be largely dependent on having sufficient work to attract bids. The present contracts in New York for routine summer maintenance should serve as a good test of the viability of contracting for routine maintenance of gaging stations. Other offices have been encouraged to determine the feasibility of having routine rehabilitation and maintenance done by contract or cooperative agreement.

EXPERIENCE OF OTHER GOVERNMENT AGENCIES

The President's Commission on Privatization (1988) reviewed a broad spectrum of Government activities and found efficiency, quality of service, or both, to be derived from increased non-Federal participation in the provision of services. None of the activities investigated by the Commission had scientific information as a final product, as is the case with the WRD's hydrologic data-collection and analysis program. Therefore, literature searches for documented attempts to privatize collection of hydrologic data were made in this feasibility study.

The initial attempt to locate published documentation on privatization of water-data collection was on a public sector data base (OCLC). This effort produced only the information that has been previously cited (Kilpatrick and others, 1983). The second attempt was a "Dialindex" search that identifies the number of citations in each key word or key word combination, using the word combinations strategy (Boolean Search) of:

Privatization OR Commercialization OR Contracting Out
AND
Water OR Hydrologic
AND
Analysis OR Collection OR Publication

Table 5 lists the five data bases queried through the Dialog system and the frequency of these word combinations.

Table 5. Summary of Dialog Data Base Entries on Privatization of Data Collection.

DATA BASE	NUMBER OF ENTRIES
NTIS	114
GPO Monthly Catalog	0
Congressional Record	0
Congressional Information Service	35
Federal Register	0

The NTIS data base was accessed and the first two abstracts were retrieved to see the nature of the qualifying literature. The search was further restricted to exclude waste and/or treatment. This narrowed the number of entries from 114 to 95. A printout of the 95 titles indicated that none of the articles were related to the privatization of hydrologic data collection.

A Congressional Information Service title retrieval for the key word combination revealed no Congressional hearings related to the privatization of hydrologic data collection, or even a close analog.

General types of weakly related information exist. One type is the broad philosophical tract--for example, "The Limits of Privatization" by Paul Starr (1988). The others are governmental analyses--for example, "Federal Productivity - DOD's Experience in Contracting Out Commercially Available Activities" by the General Accounting Office (1988). This set of publications does not address the narrower subject of privatization of water data collection.

The only other related study that applies directly to the USGS feasibility study is the Environment Canada investigation conducted by R. L. Walker & Partners and Acres International Limited (1985), "Review of Current and

Alternate Organizations for Collection and Delivery of Water Quality Data." That report is discussed in some detail in the next section of this feasibility report.

The Department of Defense (DOD) has the most experience with evaluation and implementation of A-76, commercialization. DOD completed 1,661 cost comparisons from 1979 through 1986, covering 30,287 FTE's. Approximately 52 percent of those studies resulted in a government function being contracted out to the private sector (GAO, 1988). Of the 25 functions (Appendix E) studied by DOD, few appear to be even weakly related to the six data-collection and analysis functions of this feasibility study.

The mechanisms used by DOD Base Operation Support contractors to achieve cost savings as a result of the A-76 competition were defined in a Logistics Management Institute analysis (Handy and O'Conner, 1984) and include

- heavy reliance on overtime
- use of part-time labor
- simplified supply procedures
- responsive vehicle and equipment maintenance
- ability to lower pay
- ability to quickly hire and fire.

The WRD currently uses overtime and part-time labor to the extent permitted by Federal statutes. Simplification of most basic data-collection procedures would not be permitted in external contracts since the current procedures are intended, in part, to verify the data-collection process. As a practical matter, the procedures would likely become more complicated in order to provide adequate quality assurance in the absence of direct supervision. The WRD generally has field vehicle and equipment repairs performed by the private sector. The ability to lower pay or hire and fire quickly are not available to the WRD.

INTERNATIONAL VIEW

The collection and analysis of water-quantity data in Canada by the Water Resources Branch of the Inland Waters Directorate of the Department of Environment is quite similar to the surface-water data-collection programs of the WRD in the USGS. In 1985, a review of the work of the Water Resources Branch was undertaken by R.L. Walker & Partners and Acres International Limited (1985). The purpose of that study was to define the advantages and disadvantages of either continuing to collect water-quantity data through the Water Resources Branch, or of transferring responsibilities for data collection to the private sector, the Provinces, or a Crown corporation. The study was a followup to an earlier internal study by Environment Canada (1980).

Like operations by the WRD in the United States, the surface-water gaging network in Canada had evolved over 90 years. Also, like in the United States, the Provinces and Territories have entered into formal agreements to share the costs of data collection with the Federal Government.

For the 1985 study, surface-water quantity data-collection activities were categorized into one of four functions. Those functions were: (1) system planning, (2) system operation, (3) system outputs, and (4) quality assurance. A preliminary analysis of the potential advantages and disadvantages of the various alternatives (either continue with status quo, or transfer responsibilities to the private sector, the Provinces, or to a Crown corporation) was given to representatives of the Provinces and to a sample of water-data users. According to R.L.Walker & Partners and Acres International Limited (1985, p. 1), the responses indicated "... widespread acknowledgement of the need for a national water quantity survey and considerable satisfaction with the way in which the Water Resources Branch conduct these surveys in cooperation with the provinces."

R.L. Walker & Partners and Acres International Limited (1985, p.2) concluded:

"The option of privatization is not considered feasible in terms of transferring broad responsibility for water quantity data collection and delivery to the private sector. Indeed, to have this done by the private sector would require the creation of new enterprises having exclusive territorial licences for systems operations. Insofar as the current operations of the WRB have been found to be well managed with due regard for economy and efficiency, the probability of private licencees being able to operate at the same or lesser level of cost is very unlikely. Considerable concern was expressed by the clients and users as to any change which could adversely impact the consistency and quality of the hydrometric data base records."

"Under existing arrangements, a substantial amount of work is currently contracted out. While there may be areas where some further contracting out may be cost effective, this approach does not appear practical or economic in terms of major functions such as systems operations."

The alternative of turning operation over to the Provinces was considered to be feasible in some Provinces, but the majority of provincial managers expressed little interest in taking over those operations. The alternative of transferring operations to a Crown corporation were also considered feasible. However, the potential disruptions that might result from such action were believed to outweigh the potential advantages.

The final recommendation of the report was that the collection of water resources data continue to be done by the Water Resources Branch. However, the study also concluded that water-quantity surveys consider:

- o greater integration of water-quantity and water-quality activities,
- o consideration of shorter-term measurements in response to user requirements,
- o allocating more resources for evaluation of new equipment,

- o review of network requirements on a regional basis in concert with the Provinces to define the optimal spatial coverage of stations, and
- o additional contracting out, when possible.

The report by R.L. Walker & Partners and Acres International Limited (1985) also examined the management and operations of hydrological surveys in the United Kingdom, France, new Zealand, and Australia. In addition, the World Meteorological Organization (WMO) compiled information and statistics on the operation of hydrological services in other countries (WMO 1977a, WMO 1977b). The latter report presents statistics on the hydrological activities in 101 countries of the world. According to the WMO (1977b), 96 of the countries operate hydrometric stations, 82 collect ground-water data, 78 collect sediment-discharge data, and 72 collect data on water quality. Most treat such data collection as a governmental function, although most do not consider it to be exclusively a governmental function.

INTEREST AMONG POTENTIAL CONTRACTORS

A questionnaire (Appendix F) was prepared jointly with the American Society of Civil Engineers (ASCE) to sample the potential interest among consulting firms in increasing the privatization of hydrologic-data collection. The questionnaire was mailed by ASCE July 6, 1989, to 14 firms that presently are active in water-resources related consulting activities. The questions posed are intended to measure both the interest in increased privatization and the present involvement in the actual collection of hydrologic data.

Only five responses have been received at present (September 27, 1989). One firm expressed a major interest in collecting hydrologic data under privatization; two expressed moderate interest; and two expressed little interest. One firm reported that it presently did not operate any hydrologic data-collection sites that had 2 years or more of record. Collectively, the remaining four firms presently operate the following number of gages having 2 years or more of record: surface-water quantity, 38; surface-water quality, 36; ground-water quantity, 126; and ground-water quality, 229. The firm expressing a major interest presently collects surface-water quantity and quality data at three sites, and ground-water quantity and quality data at six sites.

The following reservations were voiced by those firms expressing little or moderate interest in pursuing projects to operate systematic data-collection sites:

- o Funding uncertainties,
- o Possibility of Government-imposed profit/overhead restrictions,
- o Possible restrictions on installing/using up-to-date monitoring equipment/software,
- o Competitive low-budget-type project,
- o Professional challenge may be lacking,
- o Prefer to work for private sector clients,
- o Ability to be cost competitive,
- o Routine nature with little creativity.

USER REACTION TO POTENTIAL CHANGES

Obtaining potential user reaction to changes that have only been contemplated is necessarily a subjective process. Nonetheless, the steady erosion in numbers of hydrologic data collection sites caused by level budgets and inflating costs has caused reaction among users that may give insight into changes that could occur under privatization. Data compiled by Kilpatrick and others (1983) suggest that station costs will increase if the WRD is to maintain the quality control necessary to continue to publish and certify the data. That, in turn, would lead to further decreases in the number of gages operated for a given budget.

ASCE issued a 1987 policy statement on the collection of surface-water data. That policy statement is reproduced as Appendix G. The concluding paragraph from the policy statement is repeated below:

"Due to the interstate nature of many river basins, basic water data collection is an appropriate responsibility of the Federal government. Moreover, one lead agency must be assigned the task of collecting and reporting these data in a uniform manner. This responsibility has traditionally been assigned to and should remain with U.S.G.S. in cooperation with other Federal agencies and State and local governments."

William J. Carroll, President-elect of ASCE, testified March 10, 1988, before a U.S. House of Representatives Subcommittee in relation to proposed FY 1989 budget cuts for USGS's surface-water data-collection and analysis program. His testimony is included as Appendix H. The following quotation from his testimony demonstrates ASCE's position regarding the role of the Federal Government in surface-water data collection:

"It should be noted, however, that in recent years, the States have been willing to spend considerably more than the Federal Government in the Cooperative Program for data collection and analysis (for example, \$12.8 million more in fiscal 1988).

We believe that the U.S.G.S. basic water quantity data collection activities are:

- 1) essential, because the value of hydrologic data increases with both the length and continuity of the record;
- 2) the logical responsibility of the Federal Government because the States cannot possibly assume the support and leadership role of U.S.G.S. for interstate water systems;
- 3) cost-effective, because coordinated water data collection eliminates overlapping and duplicative efforts.

Data analyses as well as research and development of new predictive techniques can be accomplished by innumerable public or private water-resource agencies, as the need arise, if the long-term basic data

exists. If the data is lacking, no one, including the U.S.G.S., can manufacture it. Accordingly, this activity must be one of U.S.G.S.'s highest priorities."

The membership of the Advisory Committee on Water Data for Public Use (ACWDPU) is a broadly-based cross section of non-Federal agencies and individuals. At their May 22-25, 1989, meeting in Orlando, Florida, the committee concluded (ACWDPU, written commun., May 31, 1989) that the "... hydrologic data system must not be compromised by privatization because:

- o Credibility of the data system will deteriorate,
- o expertise will degenerate,
- o changes will be disruptive,
- o impartiality of data will be compromised,
- o continuity of record will be lost, and
- o decisionmaker's standard of dependence on impartial, accurate data, and high quality scientific analyses will be compromised."

Finally, the Interagency Advisory Committee on Water Data (IACWD), composed of 30 major organizations representing seven departments and seven independent agencies of the Federal Government, is preparing an issue paper on Surface-Water Quantity Information. That issue paper is being prepared under the authority of OMB Circular A-67, which requires that Federal agencies coordinate their efforts for acquiring and managing water data. In a preliminary draft of the issue paper, the committee (IACWD, written commun., July 12, 1989) concludes:

"Within manpower constraints, the collection of surface water quantity information should be concentrated within the USGS. This will ensure consistency, continuity, and quality of the data collection activity.

The State and local governments should not expand their data collection activities unless it is impossible for the USGS to meet their data needs. As more and more State and local governments become involved in data collection, the problems of quality assurance, archiving and publishing the data increase significantly.

The data collection and analysis activity should not be contracted to private enterprise. The resources (personnel, equipment, office facilities, etc.) needed to pursue this data collection activity exceed that of most private firms and previous experience has shown that it is not cost effective to contract out this activity (Kilpatrick and others, 1983)."

The six-member Review Committee established to advise the WRD's feasibility study committee also reacted to the potential privatization of hydrologic data collection and analysis. There was general concern about the effects of privatization on data continuity, credibility, and legal acceptability. They felt this could have a severe impact on long-standing inter-governmental and professional relations. As taxpayers, they expressed concern about the effect on taxpayer's investment in hydrologic data. They stated that the institutional expertise and institutional memory of the USGS were built at taxpayer expense; that expertise and memory could not be maintained if hydrologic data collection and analysis were done by contract.

The Review Committee emphasized the importance of continuing the USGS role in developing techniques and procedures and in acting in a Nationwide capacity to assure consistency and compatibility of hydrologic data. They also expressed concern about the potential cost--none of the Review Team members could see how costs could go down under privatization, given the National distribution of WRD offices and hydrologic data-collection sites, and the need for private enterprise to make a profit.

Other Federal agencies also are being asked to evaluate whether they can increase privatization in their own programs. One anticipated reaction to privatization of the WRD's hydrologic data-collection activity is that other Federal agencies would contract directly for these data, rather than having WRD act as their agent in contracting. As a consequence, the number of published continuous-record streamflow stations could be expected to further decline as those agencies produce only the specific data needed for their particular application.

CHANGES IN THE WRD UNDER PRIVATIZATION

Under increased privatization, perhaps the most immediate impact on WRD would be an increase in the requirement for contract managers and specification writers. This projection can be made with some confidence based on the earlier experience in WRD with contracting for data collection (Kilpatrick and others, 1983). Also, the amount of quality assurance effort would probably increase, at least initially, until confidence was gained in the contractors and in the process. Ultimately, WRD could expect a reduced requirement for those persons who are presently doing the work that is to be contracted. The positions affected by this would be somewhat dependent on the function or functions in which privatization occur. However, a reasonable expectation would be that the medium and lower grades of the hydrologic technician series would be most directly affected.

Although the reduction in requirements for the affected jobs would be gradual, immediate adjustments might be necessary. The WRD is presently at or near FTE ceilings that have been imposed. The increased requirement for contract managers and specification writers would be immediate, and it is unlikely that those would be the primary skills of the persons whose jobs were being contracted.

In time, privatization of hydrologic data-collection activities could be expected to lead to a reduction in WRD expertise and credibility in that area. This change would appear to be inevitable as one simply cannot become expert in a particular area without performing the task. Although this reduction in expertise and credibility would be gradual, it would have implications on privatization itself. At some point in time, the ability of WRD to manage contracts for the collection and analysis of hydrologic data would be affected.

SUMMARY AND CONCLUSIONS

Only 10 percent of the WRD's hydrologic data-collection activities are independently funded by USGS from Federal funds. About 26 percent of the

total funding comes from other Federal agencies, and the remaining 64 percent comes from the Federal-State Cooperative Program, in which States and local agencies must contribute at least one-half the funds. The current program has evolved over about 100 years and includes participation of more than nine hundred Federal, State, and local cooperators, who view the data-collection activities as a shared governmental responsibility in which they have a large, long-term financial investment and vested interest.

The WRD currently practices two forms of privatization: 1) contracting with private entities, and 2) allowing credit for services provided (internally called Direct Services) by cooperating State and local government agencies. WRD contracts with private entities totaled \$65 million in FY 1988. This amount represents 23.3 percent of the total WRD program funds available in FY 1988. Because total WRD program funds include non-Federal funds in the Cooperative Program and reimbursement from other Federal agencies, the \$65 million actually represents 43.5 percent of the Federal funds appropriated by the Congress to the WRD in FY 1988. These contracts are distributed among all programs of the WRD; however, the portions that apply to data-collection and analysis activities should be similar to the WRD percentages.

The second form of privatization, use of Direct Services credits, totaled \$8.3 million in just the data-collection and analysis program in FY 1988. About one-half of that amount was for the collection of water-use data. Under the water-use program, State agencies collect the data and receive Direct Service credits. Because those credits amount to about 40 percent of the total funds in the water-use program, that program is 40 percent privatized under the definitions of this study.

Currently (1989), there are 1,417 full-time equivalents (FTE) in the hydrologic data-collection program. About 74 percent of these FTE are involved in the primary functions of onsite data-collection and office-analysis functions; an additional 10 percent are involved in laboratory analysis. The remaining 16 percent of the FTE are distributed among the support functions as follows: publication and distribution, 4 percent; equipment procurement and supply, 4 percent; and construction and maintenance, 8 percent.

In assessing the potential for additional privatization, the individual functions were compared to definitions of governmental functions in OMB Circular A-76. Based on the comparison, the onsite data-collection and office-analysis functions are judged to be governmental functions because of the delegation of authority to, and the exercise of discretion by, the person collecting the data. The data collected at each site are unique and must be accurate and timely, but the field person encounters changing hydrologic conditions and must react accordingly. Because of this, the data collectors must make management decisions on the spot as a part of their every-day duties. Similarly, the laboratory analysis function and the equipment procurement and supply function are judged to be governmental because of the emphasis on administration, oversight, and quality control of contracts. In spite of these determinations, all six functions were included in the remainder of the feasibility analysis.

The potential for additional privatization of either the onsite data-collection or the office-analysis functions is limited. The multiple uses

of, and the reliance on, the data for national and regional analyses would require that the data continue to be available in the public domain. Given that privatization would necessarily result in numerous entities collecting hydrologic data across the nation, the USGS would have to perform stringent quality assurance before the data could be certified and published. Such requirements would likely cause the costs of data under privatization to be greater than present costs.

The above conclusion is supported by documented analyses efforts to privatize collection of hydrologic data reported by the USGS (Kilpatrick and others, 1983) and Environment Canada (R.L. Walker & Partners and Acres International Limited, 1985). A retrospective analysis by Kilpatrick and others (1983) reported that costs of collecting hydrologic data by contract for coal-lease areas of six States during 1978-81 were about 55 percent greater than the cost of performing the same work using WRD personnel. Similarly, a review of the work of the Water Resources Branch of the Inland Waters Directorate of Environment Canada by R.L. Walker & Partners and Acres International Limited (1985) concluded that privatization of the Branch's water-quantity data collection was not feasible, and that there was little probability that the private sector could operate at the same or lesser level of cost.

About 10 percent of all surface-water station records published and archived by USGS are furnished by other agencies. The bulk of these data are collected by State and local agencies for Direct Services credits under the Cooperative Program and are, therefore, already privatized under the definitions of this study. However, excepting water-quality data collected to satisfy specific purposes, only about 25 percent of the States operate significant numbers of hydrologic data-collection stations (Office of Water Data Coordination, 1981). It is unlikely that States not presently collecting significant amounts of hydrologic data would develop that capability in the near future.

Responses to questionnaires circulated by ASCE in conjunction with this feasibility study suggest that enthusiasm for taking on the data-collection role is limited in the non-governmental sector. Fourteen firms active in water-resources related consulting were polled, and five responses were received. Only one firm expressed a major interest in collecting hydrologic data under privatization; that firm currently collects such data at fewer than ten sites. Nationwide privatization, therefore, may be problematic.

The potential for additional privatization of either the laboratory analysis function or the equipment procurement and supply function is perhaps moot. Both functions presently contain a significant degree of privatization, and both functions have a heavy emphasis on administration, oversight, and quality control of contracts. Further privatization would jeopardize WRD's ability to perform those roles.

Publication and distribution is a support function with little opportunity for additional privatization. All annual water-data reports are now printed by contract printers; given the distributed nature of the work load and the relatively small total effort, privatizing the remainder of this function would not be cost effective.

Construction and maintenance has potential for additional privatization, but realizing that potential will depend largely on having sufficient work in a given area to attract potential contractors. Presently, equipment such as tractor-mounted backhoes needed to build stream-gaging stations is usually obtained either from local cooperators through Direct Services credits or by hiring local contractors.

The Federal hydrologic data-collection efforts and networks are widely held to be appropriate Federal functions. Many independent organizations have formally expressed dismay at recent shrinkage in the number of streamgaging stations. If quality-control requirements under privatization cause hydrologic data-collection costs to rise, the decline in the number of gages would accelerate. Any further reduction in data-collection networks would increase the difficulty of assessing the status of the nation's water resources.

There is little support among cooperating agencies or data users for accelerated privatization of the data-collection program of the WRD. The Review Committee members expressed grave concern about the effects of privatization on data continuity, credibility, and legal acceptability. They felt this could severely impact long-standing relations between the WRD and its local, State, and Federal government cooperators. Similar concerns were expressed by a broadly based cross section of non-Federal agencies and individuals (Advisory Committee on Water Data for Public Use, written commun., May 31, 1989).

Current data-collection programs provide institutional expertise and memory necessary to maintain program stability and effectiveness. The USGS, in its governmental role, integrates multiple funding sources to produce multiple-use data networks that would soon deteriorate under large-scale privatization. In recent years, in fact, the non-Federal contributors have been willing to spend considerably more than the Federal government could match in the Cooperative Program. The current flexibility employed in the data-collection program has been determined on a State-by-State basis through hundreds of joint-funding agreements.

The WRD is currently contracting for a significant portion of its hydrologic data-collection activities, and additional opportunities should be evaluated on a case-by-case basis. However, large-scale privatization of a greater portion of the WRD's hydrologic data-collection activities would be disruptive and might render a valuable engineering resource worthless. Any additional privatization must be carried out such that there is no loss of confidence in the data, and USGS objectivity is not compromised.

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APPENDICES

APPENDIX A. WRD Policy on Direct Expenditures

[Water Resources Division Supplement to USGS Manual, 500.1.3
(Release No. 194; 1/31/77)]

"Direct Expenditure" refers to that part of the non-Federal contribution to the mutually agreed upon work for which dollar-value credit is given by the Survey for services rendered by the cooperator. Under the 50-50 matching requirement, the non-Federal contribution or cooperator's share can be the sum of payment for services rendered by the Survey and credit allowed the cooperator for evaluated services.

Direct expenditures by the cooperator for personal and other services or supplies may be recognized by the Survey as part of the non-Federal contribution, provided that such expenditures are: (1) For clearly defined parts and dollar amounts of specific cooperative investigations, projects, or work units mutually planned by and acceptable to the Survey and the cooperating agency; (2) For work of high priority that is relevant to the cooperative program; (3) Limited to an amount or level that would not reduce the effectiveness in maintaining technical competence and operational efficiency within the offices of the Geological Survey; (4) For work that is operationally under the direction of or subject to periodic review by the Survey representative in charge; and (5) Adequately documented to satisfy Federal accounting regulations.

A. Acceptable Types

The work performed or the items purchased shall constitute an integral and essential part of the cooperative program. The scope of work conducted by a cooperator may range from elements or parts of projects to entire projects. His contributions may include, but are not necessarily limited to: (1) The service of competent State or local agency personnel (professionals, technicians, clerks, gage observers, etc.); (2) The travel, field, and other direct expenses of such employees; (3) The purchase of supplies and materials; (4) Office space and related services furnished to the Survey if paid for or provided by the cooperator; (5) Leasing of hydrologic station sites or easements, and of specialized equipment, such as drilling rigs and electric loggers; (6) Qualifying services, such as State or local agency-supported laboratory services, test drilling, test pumping, geologic mapping, hydrologic data collection and tabulation; (7) Reproduction, duplication, typing and drafting services not directly connected with formal publication and printing; (8) Capital investments by the cooperator for nonexpendable property should not be credited as direct expenditures unless approved for each individual case in advance by the Chief Hydrologist. An appropriate annual rental value of such property, however, based on its use in the cooperative program, is acceptable as a direct expenditure; and (9) Other expenditures comparable with the Survey's mission and related program expenditures.

B. Acceptable Levels

It shall be the responsibility of the Regional Hydrologist to assure that the level of direct expenditures of a District's aggregate cooperative program does not become so excessive as to weaken overall program effectiveness. Many factors, such as maintaining adequate WRD District technical competence and a necessary array of specialist skills, availability of Federal co-op funds, Federal personnel ceilings, Federal program goals and objectives, responsiveness to needs of other Federal agencies, operating efficiency, and quality standards of products, need to be considered.

C. Standards of Work

Services or supplies provided by direct expenditures shall result in no greater costs or in any reduction in scientific quality, scope and coverage than those performed by the Survey. USGS quality control techniques, established for laboratory or other repetitive work, shall also be applicable to these activities when supported by direct expenditures.

D. Documentation

All program, project, and progress-report documents should clearly identify direct-expenditure elements (funds and activities) as specified in the instructions for preparing those documents. The summation of all direct expenditure elements as shown on project documents with a particular cooperator must equal the total direct-expenditure portion of the cooperative offering as shown on program documents.

Responsibility for certification of direct expenditures by a cooperator rests with the District Chief, who must certify that the work or service has been performed in accordance with prior agreements.

E. Annual Review

Direct expenditures should be reviewed and restructured as part of annual planning and programming to reflect program requirements; they are not continued from year to year at a constant or fixed proportion or amount of the total program with a cooperator.

APPENDIX B. Summary of Contractor-Operated Data Stations (from Kilpatrick and others, 1983, p. 4).

<u>Contract area</u>	<u>Surface-water</u>			<u>Ground-water</u>		<u>Surface-water</u>	
	<u>Quantity</u>	<u>Quality</u>	<u>Sediment</u>	<u>Levels</u>	<u>Quality</u>	<u>Gain/loss sites</u>	<u>Quantity</u>
Montana							
1978	2	8	8	0	0	160	112
1979	1	7	7	0	0	59	28
1980	1	7	7	0	0	37	17
1981	0	0	0	0	0	0	0
New Mexico ¹							
1978	12	12	12	15	15	0	0
1979	12	12	12	15	15	0	0
1980	12	12	12	15	15	0	0
1981	13	13	13	21	17	0	0
North Dakota							
1978	23	23	23	0	0	0	0
1979	30	30	30	0	0	0	0
1980	33	33	33	0	0	0	0
1981	33	33	33	0	0	0	0
Wyoming ²							
1978	11	11	11	0	0	0	0
1979	11	11	11	0	0	0	0
1980	13	13	13	0	0	0	0
1981	14	14	14	0	0	0	0
Oklahoma ³							
1978	0	0	0	0	0	0	0
1979	12	12	12	0	0	0	0
1980	13	13	13	0	0	0	0
1981	26	25	25	5	0	0	0
Utah							
1978	0	0	0	0	0	0	0
1979	12	12	12	0	0	52	13
1980	15	15	15	0	0	56	0
1981	18	19	19	0	0	74	0
Totals ⁴							
1978	48	54	54	15	15	160	112
1979	78	84	84	15	15	111	41
1980	87	93	93	15	15	93	17
1981	104	104	104	26	17	74	0

¹ 3 precipitation gages; 3 automatic sediment samplers

² 2 automatic sediment samplers

³ 12 precipitation gages; 10 automatic sediment samplers

⁴ 15 precipitation gages; 15 automatic sediment samplers

APPENDIX C. List of Surface-Water Cost-Effective Analysis Reports

Alabama	Water-Resources Investigations (WRI) 86-4336
Alaska	WRI 84-4096
Arkansas	WRI 84-4084
Central Florida	WRI 84-4116
Connecticut	WRI 85-4333
Georgia	WRI 84-4109
Hawaii	WRI 84-4126
Idaho	WRI 84-4132
Illinois	WRI 84-4123
Indiana	WRI 85-4343
Iowa	WRI 84-4171
Kansas	WRI 84-4107
Louisiana	WRI 85-4044
Maine	Water-Supply Paper 2244
Maryland/Delaware/D.C.	WRI 87-4093
Massachusetts/Rhode Island	WRI 84-4097
Michigan	WRI 85-4293
Minnesota	WRI 88-4129
Mississippi	WRI 86-4060
Missouri	WRI 87-4254
Nebraska	WRI 84-4098
Nevada	WRI 87-4213
New Hampshire/Vermont	WRI 85-4173
New Jersey	WRI 84-4108
New York	WRI 85-4328
North Carolina	WRI 85-4036
North Dakota	WRI 89-4068
Northeastern California	WRI 84-4127
Ohio	WRI 85-4072
Oklahoma	[Pending]
Pennsylvania	WRI 85-4077
South Carolina	WRI 85-4210
Virginia	WRI 85-4345
Washington	WRI 84-4332
West Virginia	WRI 87-4089
Wisconsin	WRI 86-4125
Wyoming	WRI 87-4264

Several Districts published the data-use results as a separate report. Following is a list of those reports.

Blumer, S.P., and Hauth, L.D., 1984, Use and availability of continuous streamflow records in Oklahoma: U.S. Geological Survey Open-File Report 84-747.

Cruff, R., 1986, Data uses and funding for the steam-gaging program in Utah: U.S. Geological Survey Open-File Report 86-051.

Gold, R.L., and Denis, L.P., 1985, Use and availability of continuous streamflow records in New Mexico: U.S. Geological Survey Open-File Report 85-572.

- Kircher, J.E., and Petsch, H.E., Jr., 1984, The stream-gaging program in Colorado: U.S. Geological Survey Open-File Report 84-451.
- Little, J.R., and Matthews, D.K., 1985, The stream-gaging program in South Dakota: U.S. Geological Survey Open-File Report 85-564.
- Lowery, J.F., 1986, Use and availability of continuous streamflow records in Tennessee: U.S. Geological Survey Open-File Report 86-322.
- Massey, B.C., 1985, Texas stream-gaging program: An analysis of data uses and funding: U.S. Geological Survey Open-File Report 85-084.
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- Shields, R.R., and White, M.K., 1984, Uses, funding, and availability of continuous streamflow in Montana: U.S. Geological Survey Open-File Report 84-862.
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APPENDIX D. Summary evaluation of 1984 water-quality data-collection activities in Colorado and Ohio (from Childress and others, 1989)

Selected data	Colorado		Ohio	
<u>Analysis and measurements at different phases</u>	<u>Number</u>	<u>Percentage</u>	<u>Number</u>	<u>Percentage</u>
Inventoried in Phase I	240,000	100	242,000	100
Passing Phase-I screen	165,000	69	76,300	32
Passing Phase-I and II	26,400	11	34,900	14

<u>Percentages of analyses and measurements meeting each Phase-II screening criterion</u>				
Field-practices criteria:	<u>Colorado Percentage</u>		<u>Ohio Percentage</u>	
Documented sample-collection techniques	100		96	
Collection of representative samples	18		67	
Other sample-collection practices	99		89	
Sample handling and preservation	91		72	
Field-instrument use and maintenance	100		84	
Laboratory-practices criteria:				
Quality assurance	96		75	
Quality control	100		99	
Analytical methods	94		93	

<u>Numbers of analyses and measurements passing Phase-I and Phase-II screens:</u>				
Surface water	23,900		34,400	
Ground water	2,530		470	
	<hr/>		<hr/>	
Totals, rounded to nearest 100	26,400		34,900	

APPENDIX E. Primary Department of Defense Functions Included in 25
Categories of Functions (GAO, 1988, Appendix I, pp. 30-32)

Administrative telephone and communications. Administrative telephone services, telecommunication centers, communications systems installation, and intermediate repair of communications equipment.

Architecture and engineering. Architecture, engineering, and technical services.

Audiovisual. Visual information support, audiovisual production, technical documentation, electronic media, and audiovisual design services.

Automated data processing (ADP). Data processing, operation of ADP equipment, ADP production control and customer services, data transmission, maintenance of ADP equipment, systems design development and programming, and applications systems development and maintenance.

Commissary/clothing store. Commissary store operation, including shelf stocking, check out, meat processing, produce processing, storage, and issue. Clothing store operation.

Custodial. Janitor, pest management, and refuse collection.

Data entry. Data transcription/data entry and punch card processing.

Education and training. Operation of training devices and simulators, recruit training, officer training, specialized skills training, flight training, professional development, civilian education and training, dependent education, and other training.

Equipment maintenance. Intermediate and depot level maintenance of various equipment including aircraft, missiles, vessels, combat vehicles, and armaments, as well as railway, industrial, dining facility, medical, dental, and other equipment.

Facilities/grounds/utilities maintenance. Maintenance and repair of buildings and structures, including roofing, glazing, tiling, painting, flooring, electrical, plumbing, heating, and air conditioning. Maintenance of grounds and railway, waterway, and waterfront facilities. Operation and maintenance of electrical plants and systems, heating plants and systems, water plants and systems, sewage and waste plants, air conditioning and refrigeration plants, and other utilities.

Fire protection and guard. Fire prevention, protection, and guard services.

Food service. Food preparation and administration, nutritional care, and food and bakery pro.

Health services. Various medical, dental, pharmacy, and related services.

Laundry and dry cleaning. Laundry and dry cleaning services.

Library. Reference, technical, audiovisual, automated data processing media, and recreational libraries.

Mail and file. Internal mail and messenger, publication distribution, and visual information depositories.

Management/administrative support. Advertising and public relations, finance and payroll, debt collection, word processing, translation, auditing, court reporting, cost-benefit analysis, statistical analysis, scientific studies, management studies, and other special studies.

Manufacturing. Products fabricated in-house including ordnance equipment, containers, chemicals, lumber, construction, rubber and plastic goods, optical products, sheet metal, foundry, and other products.

Motorpool/vehicle maintenance. Maintenance of noncombat vehicles, installation bus services, ambulance service, and other motor vehicle operation. Upholstery, glass, body, mechanical, and other vehicle maintenance services.

Printing. Printing and reproduction.

Social/community services. Various recreational, individual, and family services.

Supply/warehousing/distribution. Base supply operations, ocean terminal operation, cargo handling, lumber operations, material handling equipment operation, crane operation, storage, receipt, packing and crating, shipping, preservation and packaging, and acceptance testing.

Transport. Transportation management and administration; material movement; personnel movement; personal property activities; unit movements; and air, water, rail transportation, and fueling services.

Other. Undertaker and funeral services; management of research, development, testing, and evaluation; furniture office equipment, military clothing, scrap metal, and excess property management; and mapping and charting.

Multifunction/base maintenance. Any combination of activities in two or more of the above listed categories of functions.

APPENDIX F. ASCE Questionnaire on Surface-Water and Ground-Water Data
Collection

June 30, 1989

Name
Address

Subject: ASCE Review of USGS Water Resources Data Collection Privatization
Study

Dear _____:

In the last few years, ASCE's Key Contact program has been successful in keeping the USGS Water Resources data collection activities fully funded. This year, as a condition to full funding, the Department of Interior required the USGS Water Resources Division to perform a feasibility study of privatization of the hydrologic data collection activities of the USGS. USGS has formed a study team, a management review committee and an outside review committee. At the request of USGS, ASCE has provided a member of the outside review committee.

The attached questionnaire will provide information useful to the privatization study. We ask that you take a few minutes to complete it and return it to me at our Washington, D.C. office by July 21. It will then be available for use at a July 25 review committee meeting. The questionnaire is expected to take less than 15 minutes to complete.

ASCE thanks you for your help in this matter. A write up on our role in this study will be in the ASCE News in the near future.

Yours truly,
AMERICAN SOCIETY OF CIVIL ENGINEERS

QUESTIONNAIRE--SURFACE-WATER AND GROUND-WATER DATA COLLECTION

1.0 Does your firm systematically collect data on the quantity or quality of surface-water or ground-water data (Yes or No)? Systematic collection of data implies that the data for a given site are collected routinely over a long period (2 years or more), as opposed to data that are collected for a short duration to satisfy a specific objective or project need.

- a. Surface-water quantity _____
- b. Surface-water quality _____
- c. Ground-water quantity _____
- d. Ground-water quality _____

SKIP TO 2.0 IF ALL ABOVE ANSWERS ARE NO.

1.1 For approximately how many sites are data presently being collected?

- a. Surface-water quantity _____
- b. Surface-water quality _____
- c. Ground-water quantity _____
- d. Ground-water quality _____

1.2 Over what geographic area are the data collected (check the applicable answer)?

- a. Less than Statewide _____
- b. Statewide _____
- c. Regional (multi State) _____
- d. National _____

1.3 Are these data available to the general public (Yes or No)?

1.3.1 If yes, how are the data disseminated (check applicable answer)?

- a. Published reports _____
- b. Furnished on request _____
- c. Other _____

1.4 Are surface-water quality data collected for (check the applicable answer):

- a. Compliance monitoring _____
- b. Long-term monitoring of stream quality _____
- c. Other _____

2.0 If your firm does not systematically collect hydrologic data, what are your principal sources for such data (Check those that apply)?

- a. Other private firms _____
- b. Local or State agencies _____
- c. Federal agencies _____

3.0 Does your firm collect data on the quantity or quality of surface-water or ground-water for shorter durations than the 2 years referred to in Question 1? (Yes or No)?

- a. Surface-water quantity _____
- b. Surface-water quality _____
- c. Ground-water quantity _____
- d. Ground-water quality _____

· SKIP TO 4.0 IF ALL ABOVE ANSWERS ARE NO

3.1 For approximately how many sites are data presently being collected?

- a. Surface-water quantity _____
- b. Surface-water quality _____
- c. Ground-water quantity _____
- d. Ground-water quality _____

3.2 Over what geographic area are the data collected (check the applicable answer)?

- a. Less than Statewide _____
- b. Statewide _____
- c. Regional (multi State) _____
- d. National _____
- e. Overseas _____

3.3 Are these data available to the general public (Yes or No)?

3.3.1 If yes, how are the data disseminated (check applicable answer)?

- a. Published reports _____
- b. Furnished on request _____
- c. Other _____

4.0 Would your firm actively pursue projects to operate systematic surface-water and ground-water data collection systems and publish the data collected (Check 1)?

- a. Little interest _____
- b. Moderate interest _____
- c. Major interest _____

5.0 What are your main reservations about projects such as in 4.0 above?

- 1. _____
- 2. _____
- 3. _____

SURFACE WATER DATA COLLECTION

Approved by the National Water Policy Committee on July 30, 1987.

Approved by the Committee on Policy Review on August 21, 1987.

Adopted by the Board of Direction on October 24, 1987.

Policy

The American Society of Civil Engineers supports the basic surface water data collection programs of the Federal, state and local governments. ASCE urges the Congress to provide adequate funding to the U.S. Geological Survey (U.S.G.S.) for these programs, and to fully match the level of funding committed by the states under the Federal-State Cooperative Program for data collection.

Issue

The U.S.G.S. provides the foundation of the basic data collection program for surface water in the United States. In recent years, statutory directives and budget cuts have forced the USGS to implement significant reductions in the Nation's water data gathering network. Between fiscal years 1981-86, the total number of streamflow gauging stations declined from 17,000 to 10,740, a 37% reduction. The number of continuous record gauging stations operated by the U.S.G.S., which are of critical importance, fell from 8,830 in Fiscal Year 1980 to 7,079 in Fiscal Year 1986, a 20% reduction.

Rationale

The U.S.G.S. basic water data collection program is of vital importance to water resource planning, design, and operation in the United States. Civil engineers rely on these data for numerous projects, including: flood control, pollution control including acid precipitation, bridges, dams, and navigation. Reductions in surface water data collection will have long-term adverse effects on the efficiency and certainty of planning, design and operation of projects. Of particular concern is the need to maintain the length and continuity of the hydrologic data record, because interruptions in data collection can cause extreme hydrological events to go unrecorded.

Due to the interstate nature of many river basins, basic water data collection is an appropriate responsibility of the Federal government. Moreover, one lead agency must be assigned the task of collecting and reporting these data in a uniform manner. This responsibility has traditionally been assigned to and should remain with U.S.G.S. in cooperation with other Federal agencies and state and local governments.

APPENDIX H. Statement of William J. Carroll, President-elect, ASCE, before
the Subcommittee on Interior and Related Agencies, Committee on
Appropriations, U.S. House of Representatives

STATEMENT OF
WILLIAM J. CARROLL
PRESIDENT-ELECT
AMERICAN SOCIETY OF CIVIL ENGINEERS
ON THE
U.S. GEOLOGICAL SURVEY
FISCAL YEAR 1989 BUDGET REQUEST
PRESENTED TO THE
SUBCOMMITTEE ON INTERIOR AND RELATED AGENCIES
COMMITTEE ON APPROPRIATIONS
U.S. HOUSE OF REPRESENTATIVES

March 10, 1988

Good morning Mr. Chairman, and members of the Committee. I appreciate the opportunity to be here today. My name is William J. Carroll, and I am currently the President-elect of the American Society of Civil Engineers.

The American Society of Civil Engineers (ASCE), representing over 100,000 members, strongly opposes the Administration's proposed FY89 budget cuts for the U.S. Geological Survey's surface water data collection and analysis activities. We believe these cuts would limit unwisely the nation's future ability to manage its precious water resources, and could, in the long run, cost the nation more through over-built or inadequate water facilities. This is a classic case of penny-wisdom and pound-foolishness. At a minimum, for fiscal 1989 Congress should maintain fiscal 1988 funding levels of \$22.57 million in the Federal Program for data collection and analysis and \$59.64 million in the Federal-State Cooperative Program.

The cost of collecting water data is not great, but the impact of such data is immense and far-reaching. These data are critical to a wide range of activities, including reservoir operation; water quality and supply studies; water law court decisions; wastewater treatment discharges into streams; drainage structures for highways, bridges and culverts; flood insurance and management studies; detention pond studies for urban runoff control; planning and design of hydroelectric projects; water basin planning and investigation; forensic analysis; environmental impact analysis; and ice forecasting, jam and control studies. How can engineers devise optimum responses, and design the most cost-effective facilities, if they have incomplete and inadequate hydrologic data? The Federal cost of basic water data collection and analysis, \$73.2 million in fiscal 1988, or about one-half the water resources investigations budget, pales when compared to the cost of facilities which will be based on inadequate data as well as to the potential loss of property and life that can occur if errors in design result from use of a faulty data base.

Surface water data collection activities are carried out in the Federal Program and the Federal-State Cooperative Program of the U.S. Geological Survey's Water Resources Investigations Division (WRD). The Administration's \$19 million FY89 request for the Federal Program is \$3.5 million or 16% below the FY88 appropriation of \$22.5 million. The Cooperative Program is budgeted at \$55.9 million, \$3.7 million or 6% below the FY88 appropriation of \$59.6 million. Because the Cooperative Program is funded on a 50/50 matching basis with the States, the \$3.7 million Federal cut will be matched by the States for a total cut of \$7.4 million.

Analysis of the proposed overall U.S.G.S. budget cut of \$22.7 million (5%) in fiscal 1989 reveals that \$16.4 million or 72% of this cut will come from the Water Resources Investigations function which only comprises 33% of the overall U.S.G.S. budget. In other words, WRD would be burdened by a vastly disproportionate share of the U.S.G.S. budget cut, thereby jeopardizing water data collection.

It is difficult to predict exactly which gauging stations will be eliminated under this budget proposal. There is no doubt, however, that hundreds of data collection stations will be threatened. The \$3.5 million cut in the Federal Program could result in the loss of 80 continuous recording stations. This would mean that 20% of the continuous recording stations supported by the Federal Program would be eliminated. These are recording stations that are designed to be permanent in order to provide an absolutely reliable data record.

The \$3.7 million cut in the Cooperative Program could lead to the termination of 450 to 500 continuous recording posts, or 10% of all continuous recording stations supported by the Cooperative Program. These closures would also destroy the complete reliability of the data that needs to be obtained.

Cuts of this magnitude, particularly when considered with previous funding cutbacks, raise very serious implications. Between fiscal years 1981-1987 the total number of surface water data collection stations was reduced from 17,000 to 10,624, a 37% cut.

The U.S. Geological Survey has used cost sharing arrangements with non-federal agencies to stretch further the Federal funds appropriated for water resource data collection. Whereas we believe complete Federal funding is the best way to ensure continuity of data collection over multi-decade time periods, cost sharing is a feasible and attractive alternative to reduced data collection. It should be noted, however, that in recent years, the States have been willing to spend considerably more than the Federal Government in the Cooperative Program for data collection and analysis (for example, \$12.8 million more in fiscal 1988).

We believe that the U.S.G.S. basic water quantity data collection activities are:

- 1) essential, because the value of hydrologic data increases with both the length and continuity of the record;
- 2) the logical responsibility of the Federal Government because the States cannot possibly assume the support and leadership role of U.S.G.S. for interstate water systems;
- 3) cost-effective, because coordinated water data collection eliminates overlapping and duplicative efforts.

Data analyses as well as research and development of new predictive techniques can be accomplished by innumerable public or private water-resource agencies, as the need arise, if the long-term basic data exists. If the data is lacking, no one, including the U.S.G.S., can manufacture it. Accordingly, this activity must be one of U.S.G.S.'s highest priorities.

ASCE urges the Congress, at the very least, to reject the proposed cuts for U.S.G.S. surface water data collection activities, and maintain fiscal 1988 funding levels of \$22.57 million in the Federal Program for data collection and analysis of \$59.64 million in the Federal-State Cooperative Program.

The Administration's proposed cuts in water data collection are particularly puzzling in light of recent enactment of major water resource legislation, including The Water Quality Act of 1987 (P.L.100-4), The Omnibus Water Resources Development Act of 1986 (P.L.99-662), and The Safe Drinking Water Act Amendments of 1986 (P.L.99-339). The efficient annual expenditure of billions of dollars in these programs will be seriously undermined by cuts in basic water data collection.

AMERICAN SOCIETY OF CIVIL ENGINEERS

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