

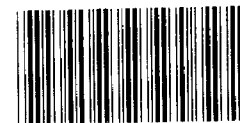
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STUDY BY THE STAFF OF THE U.S.

General Accounting Office

Water Conservation: An Update Of Federal Activity

The Nation's continued economic and physical health depend on adequate supplies of clean water. Yet, many experts believe that we are facing major water shortages in the future. Because of the effects of inflation and reduced budgets, our Nation may no longer be able to solve its water supply problems by building new projects. An alternative solution is to ensure that our present water supplies are used wisely.

This study discusses the Federal Government's efforts to encourage water conservation and the philosophy underlying them.



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P R E F A C E

Adequate supplies of clean water are vital to the continued economic and physical health of our Nation. However, much has been written in recent years warning that our existing supplies are dwindling to the point where we could be facing shortages with the potential of being more detrimental to the Nation than the energy crisis. In 1978, the President raised water conservation to national priority and directed Federal agencies to take specific initiatives designed to ensure conservation of this precious resource. At that time GAO reviewed the intent of those initiatives and concluded that, if implemented properly, they would go a long way toward correcting many conservation-related problems identified in earlier reports.

This study updates the status of the actions taken in response to the 1978 initiatives as well as the Federal Government's current conservation-related activities. Also, it discusses the philosophy underlying the administration's still-developing approach to ensuring an adequate water supply for the future.

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for 
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D I G E S T

The current administration believes that State and local governments have the primary responsibility to assure that future water needs are met. It further believes that the cost of water should be allowed to reach its true market value and that State and local governments should assume a greater share of project costs. Market forces will then determine whether or not water saving devices are the best solution to specific water supply problems. The Federal Government, according to the administration, will continue to support water conservation research activities, provide financial and technical assistance to State and local water managers, and gather and distribute water quantity and quality data. (See p. 9.)

GAO made this review to update the status of the Federal Government's involvement in water conservation, and it is the latest in a series of efforts begun in the mid-1970's, designed to help the Congress stay current on this nationally significant issue.

WHY WATER CONSERVATION
IS IMPORTANT

Clean water is vital to the Nation's economic and physical health. Many published reports, however, state that because of increased use of both surface and ground water, supplies are becoming so scarce that water shortages could reach crisis proportions. Recent statistics show that localized problems of inadequate water supply already exist in every part of the Nation, and that serious problems of both surface and ground water supply will exist in many places by the year 2000. (See p. 1.)

Traditionally, our Nation solved water supply problems either by building new projects, thus creating additional holding and delivery capacity, or developing technologies whereby

water that was formerly unusable can be used. However, these approaches are very costly and time consuming. An alternative solution is to reduce the demand on present supplies principally through conservation.

THE FEDERAL ROLE IN WATER CONSERVATION

In 1978, the President issued a water policy message to the Congress that, among other things, raised water conservation to an issue of national priority. By June 1980, 19 Federal organizations made over 150 program changes to adopt what they determined to be cost-effective and environmentally sound water conservation measures. Areas in which water conservation was made a program or policy goal included agricultural assistance, housing assistance, loan and grant programs for water supply, and wastewater treatment. In addition, at the President's direction, the Secretary of the Interior made changes to the Bureau of Reclamation's existing irrigation repayment and water service contract procedures to shift a greater portion of the Federal costs of providing water to users. (See pp. 6 to 8.)

Under the "New Federalism" approach, the present administration believes that the States are responsible for water conservation activities and that the "free market" will allow water, water project development, and/or water conservation techniques and devices to establish their own relative values and costs. The Office of Management and Budget told GAO that the administration intends to continue its efforts to recover from beneficiaries more of the cost of existing water projects and to advocate up-front cost sharing for new projects. The Chairman of the Assistant Secretaries Working Group for Water Resources told GAO that cost sharing will cause localities to more seriously consider all possible alternatives, including conservation, before spending their own money to help finance major water projects.

Seven Federal departments and agencies told GAO that they considered water conservation beneficial and important and although some of the actions taken to fulfill the President's 1978 initiatives have been rescinded, most are being continued. Examples include

--a General Services Administration policy and supporting policy objectives for Federal buildings to conserve water and utilize it efficiently in daily operations,

--a Department of Housing and Urban Development addition to the Community Development Block Grant regulations making water conservation an eligible rehabilitation activity, and

--Corps of Engineers actions taken in response to the President's 1978 initiatives for integrating water conservation into its Civil Works Program. (See pp. 9 to 16.)

REACTION TO NEW FEDERAL DIRECTION ON WATER CONSERVATION

Several knowledgeable groups and individuals such as the Interstate Conference on Water Problems and the former Executive Director of the National Water Commission, agreed with the administration that water conservation can best be achieved in the "free market." They agreed that the Federal Government should not preempt nor undermine States' management efforts. Also, they said that water prices more reflective of its market value will encourage sound water conservation and management practices. In their opinion, the Federal role includes research and financial and technical assistance to State and local governments. (See p. 17.)

STATE AND LOCAL WATER CONSERVATION EFFORTS

Several recent government and private studies show that State and local governments have taken action to conserve water. These efforts range from issuing permits or licenses that limit water users' ground and surface water withdrawals to campaigns to educate citizens on the benefits of sound water conservation

practices. These studies also show that much more can be done by States and localities to enhance water conservation practices. (See pp. 18 to 23.)

OBSERVATIONS

While Federal agencies are continuing many of the efforts instituted to implement the President's 1978 water conservation initiatives, the current administration has made some basic changes to the underlying philosophy. It believes water conservation is not a goal in and of itself, but it is one of many possible solutions to water supply problems. The administration believes that State and local governments should decide how to solve their own water problems with little, if any, interference from the Federal Government. The administration believes that the Federal role is to help with financial and technical assistance.

The administration espouses to a "free market" approach to solving water problems--an approach in which water, water project development, and conservation are allowed to find their own relative values. In addition, the administration believes that the Federal, State, and local governments should share the financial burden of building water projects that solve State and local problems. And, that the price of water provided from existing federally built projects should more closely reflect its market values.

The administration approach relies on State and local decisionmakers solving their own water supply problems in the manner that makes the most economical sense for their particular situations. More time and experience are needed to properly assess the effectiveness of this approach. (See pp. 23 and 24.)

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ABBREVIATIONS

DOD	Department of Defense
EPA	Environmental Protection Agency
EPI	Environmental Policy Institute
GAO	General Accounting Office
GSA	General Services Administration
HUD	Department of Housing and Urban Development
ICWP	Interstate Conference on Water Problems
OMB	Office of Management and Budget
USDA	Department of Agriculture
VA	Veterans' Administration
WRC	Water Resources Council

water use, more prevalent reuse of water and perhaps improvements in the accuracy of water-use estimates. He further stated that despite the slowdown, we can be rather certain that overall water use will continue to increase in future years and even as a reduced rate will require careful management and continuing reappraisal of available resources.

OUR PAST OBSERVATIONS ON WATER CONSERVATION

Since 1976 we have issued 17 reports that dealt with various aspects of water conservation. Their purposes ranged from examining broad national policy issues to assessing specific conservation technologies. The following discussion draws upon information presented in these reports. A list of these reports issued between January 31, 1976, and December 31, 1982, is contained in appendix I.

In a June 1981 report, we concluded that there are basically two ways to overcome water shortages--neither of which is simple. The first is to increase available supplies and the second is to reduce consumption. Increasing supplies entails building more projects, such as reservoirs and pipelines to create additional holding and delivery capacity, or finding technologies whereby water that was formerly unusable can be used. However, water projects are costly and take years to complete. The other answer is stretching available supplies either by conserving or augmenting them through such technologies as wastewater reuse, desalination, and cloud seeding. In this regard, we concluded in a 1978 report that conservation and augmentation efforts have not been very successful in saving water because they have not yet overcome legal, environmental, technical, and social obstacles standing in the way of their acceptance.

Conservation programs primarily involve agricultural, municipal, and industrial use of ground and surface waters. However, the greatest potential, as well as the greatest need, for better water management and conservation is the irrigated areas of the West. This is so because nationwide, irrigation accounts for over 80 percent of all water consumed, most of which occurs in the West.

In a 1976 report, we pointed out that under present practices, irrigation is relatively inefficient because the crops actually consume less than half of the water applied to them. The remaining water oversaturates the land, causing drainage problems; is absorbed by weeds; or is returned to the supply system for further uses at a downstream location, degraded in quality by minerals, fertilizers, sediment, and pesticides.

CHAPTER 1

INTRODUCTION

Our Nation's economic and physical health vitally depends on adequate supplies of clean water. Many published reports, however, state that because of increased use of both surface and groundwater, supplies are becoming so scarce that water shortages could reach crisis proportions. In many parts of the country, particularly in the arid West and Southwest, it is said that water shortages are already a reality.

Water experts cite several reasons for the impending crisis. First, and probably most important, is the continual shifting of our population from the more water abundant Northeast to the water scarce West and Southwest. Second, agriculture is assuming a more critical role in the Nation's drive to increase exports. Because irrigation is so important to the success of agriculture in the West, there is a continually increasing demand for water. Third, vast quantities of water will be needed to develop additional energy sources.

The Second National Water Assessment, prepared in 1978 by the Water Resources Council under the authority of the Water Resources Planning Act of 1965, Public Law 89-80, projected water use and supply through the year 2000 by region and subregion. Using 1975 as its base year, the Assessment results show that nationally the country will have an adequate supply of water from both surface and underground (ground water) sources to meet its needs through the year 2000. However, localized problems of inadequate surface water supply were identified in all of the Nation's 21 water resources regions. Seventeen of the total 106 subregions either have now or are expected to have a serious problem of inadequate surface water supply by the year 2000. Groundwater overdrafting--withdrawing water faster than it is being replenished--was also found to be a problem. It was reported to be extensive in 8 of the 106 subregions and moderate in 30 other subregions.

The U.S. Geological Survey, in a report released in March 1983, said the Nation's total water use had doubled between 1950 and 1980, and the Nation is withdrawing a record total of 450 billion gallons of water a day from surface and ground water sources. The report emphasizes, however, that the rate of increase of daily water use during the period 1975-80 was 8 percent as compared to 12 percent during the period 1970-75. According to the report's senior author, it is difficult to pinpoint the exact reasons for the reduction, but the water use slowdown probably reflects a combination of factors, including the decline in the economy, regional droughts that restricted

heated because according to one study, hot water accounts for 41 percent of all household water usage. In short, the benefits of conserving water, even in water rich areas, are many and may exceed the cost of employing conservation techniques. Such techniques include requiring the use of water-savings devices, installing meters, instituting leakage controls, regulating water pressure, and carrying out educational campaigns.

In the April 1978 report, we also pointed out that the Congress has consistently held that municipal and industrial water supply and water use regulations are the responsibility of State and local governments. However, as our May 1982 staff study proposed, there is no doubt that when a community or an area experiences a water crisis, enormous pressure will be put on the Congress to do something. If such crises occur in several places during the next decade, this Nation could be in a situation where its limited resources will go toward stop-gap solutions rather than more efficient and effective long-term solutions.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this review was to determine the status of Federal involvement in water conservation. This review is part of a series of our efforts begun in the mid-1970's, designed to help the Congress stay current on water conservation, a critical water-related issue of National significance. We performed this review during the period March through November 1982.

We reviewed the President's water conservation-related initiatives issued on May 2, 1978, and various status reports issued by the Department of the Interior (Interior) and the task force established to implement the initiatives. We obtained from the Office of Management and Budget (OMB) and seven Federal departments and agencies written statements on their current water conservation policies, the status of efforts undertaken in response to the President's 1978 water conservation-related initiatives, and their current water conservation activities. Where necessary for clarification or amplification of information contained in the responses, we interviewed persons identified by the respondents for that purpose. Because of the time constraints, we did not validate the accuracy of the information provided.

We interviewed knowledgeable groups and individuals about water issues including the Western States Water Council, the Conservation Foundation, the National Water Resources Association, the former Executive Director of the National Water Commission, the Interstate Conference on Water Problems, and the National Governor's Association to obtain their views as to the Federal role in water conservation. Also, we reviewed reports

Our June 1976 and September 1977 reports outline several known irrigation techniques that could lead to water savings. These included lining water conveyance and distribution systems, scheduling water deliveries properly, avoiding over-deliveries, using water-savings methods such as drip and sprinkler irrigation systems, reducing reservoir evaporation, controlling unwanted vegetation, and increasing yields without additional water through better crop varieties, fertilizers, and management.

A factor that could dramatically affect the distribution of the Nation's water supply, particularly in the West, is the question of Indian water rights. In a 1980 report we commented that the current Indian litigation and potential redistribution of water resources make it almost impossible for potential water users and State administrators to determine what, if any, water is available for new projects and uses. Further, it raises the possibility that existing water right holders may be unable to retail their rights. Presently, there are over 50 lawsuits in the courts involving Indian water rights, and it is uncertain as to how and when the courts will rule on them.

Although most water used nationwide is for irrigation, about 75 percent of the Nation's population lives in metropolitan areas constituting less than 2 percent of its land area. By the year 2000 as much as 85 percent of the population may live in these areas. Much of the Nation's industry is also located in or around metropolitan areas.

While new water supplies for municipal and industrial purposes can be developed for many areas, increased emphasis on more efficient use and conservation of existing water supplies is important. Reasons we cited in an April 1978 report included the following.

- In some areas access to new supplies may not be readily attainable, or the supplies may be located long distances from where they are needed.
- The cost of developing new supplies is often high and can be a financial burden to many communities.
- The development of new supplies by constructing dams and reservoirs has often been questioned or opposed for environmental reasons.

The April 1978 report also showed that water conservation can save energy. When less water is used, less has to be treated and pumped through distribution systems. Also, less wastewater needs to be handled by sewage treatment plants. Additional energy is saved by conserving water that has been

CHAPTER 2

THE FEDERAL ROLE IN WATER CONSERVATION

The current administration believes that State and local governments have the primary responsibility to assure that future water needs are met. It further believes the cost of water should be allowed to reach its true market value and that State and local governments should assume a greater share of project costs. Market forces will then determine whether or not water saving devices are the best solution to specific water supply problems.

Although water conservation is not specifically identified as a national priority, the Federal Government is continuing to support water conservation research activities, provide financial and technical assistance to State and local water managers, and gather and distribute water quantity and quality data. In addition, the various Federal agencies responsible for water resources activities are continuing most of the efforts undertaken to implement the President's 1978 water conservation initiatives.

RECENT FEDERAL WATER CONSERVATION ACTIVITY

In his environmental message of May 23, 1977, the President directed OMB, the Council on Environmental Quality and the Water Resources Council (WRC), to coordinate a government-wide review of water policy. Seven interdepartmental task forces each published policy option papers outlining actions they perceived were needed.

On June 6, 1978, in response to the policy option papers and recommendations from others, the President issued his water policy reform message to the Congress. In it he raised water conservation to an issue of national priority. He followed up that message on June 12, 1978, with 13 specific initiatives to Federal departments and agencies, 8 of which were related to water conservation. Specifically, the President's water conservation initiatives included:

- Amending the Principles and Standards for Planning Water and Water Related Land Resources (the criteria against which the merits of carrying out individual water resources projects are evaluated) to include a specific requirement to consider water conservation.
- Making water conservation measures a condition of water supply and wastewater treatment grant and loan program of the Environmental Protection Agency (EPA) and the Departments of Agriculture (USDA) and Commerce.

and other study results regarding water conservation efforts undertaken by several State and local governments including those prepared by the Council of State Governments, the Environmental Policy Center, the Western States Water Council, and the U.S. Army Corps of Engineers' Institute of Water Resources. A list of all the organizations contacted during the review and a short description of each is contained in appendix II.

We also examined the results of actions taken by the Congress and the various water resource agencies in response to recommendations we made in past water conservation-related reports issued between June 1976 and June 1981.

This review was made in accordance with generally accepted government audit standards.

are cost-effective and environmentally sound; program reforms were initiated to implement these measures, including regulation and reorientation of programs and additional funding. Program changes, which numbered over 150, were made in such areas as agricultural assistance, housing assistance, loan and grant programs for water supply and wastewater treatment, and federally oriented facilities. The Secretary, however, gave no estimate of the amount of water that could be saved by these efforts.

--Water contracting procedures to increase cost recovery on Federal water projects where such action is feasible were evaluated, and changes were in process.

We reported on our assessment of the President's Water Policy Message (CED-79-2, Nov. 6, 1978) and concluded that it was a positive attempt to reform water resources development practices. We reported that several of the President's conservation initiatives responded to recommendations we had made in earlier reports--particularly to our recommended changes in agencies' policies and procedures, including

- modifying financial assistance programs for municipal water supply and sewer systems to require appropriate community water conservation programs for loans and grants;
- modifying housing assistance programs to require use of water reducing technologies in new buildings to receive assistance;
- implementing measures to encourage water conservation at Federal facilities;
- increasing technical assistance for water conservation by farmers and urban dwellers;
- encouraging ground water conservation in agricultural assistance programs;
- requiring development of water conservation programs as a condition of contracts for storage or delivery of municipal and industrial water supplies from Federal projects;
- reviewing Federal programs and policies for consistency with conservation principles; and
- implementing certain changes in irrigation repayment and contract procedures under the existing authorities of the Bureau of Reclamation.

- Integrating water conservation requirements into housing assistance programs of the Department of Housing and Urban Development (HUD), the Veterans' Administration (VA), and USDA.
- Providing technical assistance to farmers and urban dwellers on how to conserve water through existing programs of Interior, HUD, and USDA.
- Requiring water conservation programs as a condition of contracts for storage or delivery of municipal and industrial water supply from Federal projects.
- Requiring the General Services Administration (GSA) to establish water conservation goals and standards in Federal buildings and facilities.
- Encouraging water conservation in the agricultural assistance programs of USDA and Interior which affect consumption in water-short areas.
- Requesting all Federal agencies to examine their programs and policies so they could implement appropriate measures to increase water conservation and reuse.

In addition, the President directed the Secretary of the Interior to improve the implementation of irrigation repayment and water service contract procedures under existing authorities of the Bureau of Reclamation. Specifically, the Secretary was directed to:

- Require that new and renegotiated contracts include provisions for recalculating and renegotiating water rates every 5 years.
- Add provisions, using existing authorities, to recover operation and maintenance costs when existing contracts are renegotiated, or earlier where existing contracts have adjustment clauses.
- More precisely calculate and implement the "ability-to-pay" provision in existing law which governs recovery of portions of project capital costs.

In June 1980, the Secretary of the Interior--charged by the President with overall responsibility for implementing the initiatives--reported the following progress.

- Nineteen Federal organizations identified programs that could reasonably adopt water conservation measures that

The Office of Management and Budget

According to OMB, the Federal Government is following a different path to achieve water conservation than was sought through the 1978 Presidential initiatives. OMB emphasized the positions that water management is a State, rather than Federal responsibility; that Federal activities should not preempt State water management efforts; and that the most effective way to achieve water conservation is to have the cost of water as closely as possible reflect its value.

In a letter dated August 31, 1982, OMB cited the following Federal actions taken to implement these policies.

"The Presidential Task Force on Regulatory Relief, established pursuant to Executive Order 12291 rescinded the requirement that users of water from Corps of Engineers' reservoirs submit a water conservation plan to the Federal Government. This action recognized that States have the primary responsibility for water management."

According to the Task Force, these plans had little effect on water use, and were primarily a paperwork exercise.

"The administration supports reducing water subsidies by amending the Reclamation Act to establish full cost pricing for water delivered to lands in excess of the legal acreage limit. Implementation of this policy will be coordinated with proposed changes in acreage limitations, and will reflect legislative changes as they occur.¹

"The administration is giving priority to project proposals involving voluntary increases in non-Federal financing. This closer tie between those who finance and benefit from projects will help to ensure adequate attention to water conservation measures."

In response to our invitation for additional comments on the role of the Federal Government in water conservation, OMB said:

"* * * water conservation is not universally beneficial, and may have negative impacts in areas where recharge of underground aquifers is dependent on

¹The acreage limitations were changed by Title II of the Reclamation Reform Act of 1982 (Public Law 97-293, 43 U.S.C. 390) enacted Oct. 12, 1982.

In that report we also pointed out, however, that some broader areas in which we had made recommendations were not addressed by the policy nor have they yet to be addressed. These issues include the need to

- establish a clearinghouse for water conservation practices involving municipal and industrial water supplies,
- solve constraints that prevent or impede the implementation of better water management and conservation practices, and
- better define the Federal role in promoting better water management and conservation.

CHANGES IN THE FEDERAL WATER CONSERVATION ROLE

The current administration believes that the States are responsible for water conservation activities with as little Federal interference as possible. It also believes that the "free market," will allow water, water project development, and/or water conservation techniques and devices to establish their own relative values and costs. Even though water conservation is not specifically identified as a national priority, the administration intends to (1) continue to support related-research activities, (2) provide technical and financial assistance to State and local water managers, (3) gather and disseminate water quantity and quality data, (4) continue its efforts to recover from beneficiaries more of the cost of existing water projects, and (5) advocate cost-sharing for new ones. The Chairman of the Assistant Secretaries Working Group for Water Resources stated that cost sharing will cause localities to more seriously consider all possible alternatives, including conservation, before spending their own money to help finance a major water project.

Although some actions taken in response to the 1978 Presidential water conservation initiatives have been rescinded, many are being continued. The following discussion summarizes the current positions and activities of seven Federal departments and agencies, which we asked in August 1982 to provide us with information on water conservation efforts. We chose these seven because they had major responsibilities in carrying out the initiatives.

In general, the agencies responded that they considered water conservation beneficial and important and although some of the actions taken to fulfill the 1978 initiatives had been rescinded, most are being continued.

- Set-aside specific funds for cost-sharing rural clean water projects.
- Expended cooperative funding that gave emphasis to water conservation.
- Required that water conservation be fully considered in all river basin studies.
- Accelerated water conservation-oriented plant testing.
- Provided a higher Federal rate of cost-sharing for water conservation practices and priority cost-sharing with farmers who follow a sound water conservation plan.
- Made water conservation practices eligible for accelerated financial assistance in watershed projects.
- Informed the public of its water conservation activities as a condition for loans or grants from the Farmers Home Administration.
- Required installation of various water saving devices; metering, if feasible; setting of realistic water rates; and repair of water system leaks.

Regarding the current status of activities started in response to the initiatives, USDA said: "Although emphasis has shifted during the past couple years, the activities are still being carried out."

General Services Administration

GSA told us it maintains a policy to conserve water and utilize it efficiently in daily operations and has written supporting policy objectives, including the following:

- To maintain a 20-percent water use reduction goal for calendar years 1983 through 1985.
- To apply water conserving practices in all GSA-operated buildings/facilities.
- To maintain an emergency water reduction plan.

One of the Presidential initiatives (see page 7), which dealt solely with water conservation at Federal facilities, was addressed to the Administrator of GSA. According to GSA, it took several actions to implement that initiative, which is still being practiced. GSA told us this policy is being supported by continuing memoranda from its central office to its

seepage from surface waters, such as agricultural return flows. The States have primary responsibility in water management and also are better situated to understand the unique requirements of each geographical area."

Corps of Engineers

The Corps stated that under current policy, water conservation should be a means of addressing the future requirements for water in the same manner as supply augmentation. Also, the same set of principles and procedures to evaluate project proposals is used whether the proposals are for new water supply projects or for techniques designed to manage the demand for water.

The response stated that the Corps would continue to work with non-Federal interests in planning for future water supply and in non-Federal actions that require a Corps permit to achieve balanced consideration of conservation and supply augmentation. Additionally, the Corps stated that the plan of action it developed to incorporate the policies of the 1978 Presidential initiatives still represents an appropriate implementation strategy for integrating water conservation into its Civil Works Program. Until water conservation routinely is included in all water planning, the Corps sees its role as one primarily of emphasis. It said it will carefully monitor studies as they are reviewed and will address the need for added emphasis if problems occur. The Corps added that it needs no special directives at this time to carry out this policy.

The Corps also pointed out that the requirement for inclusion of a water conservation clause in each water supply contract (discussed above under OMB) was rescinded following a review by the Presidential Task Force on Regulatory Relief.

Department of Agriculture

The Department of Agriculture stated that because water is so essential, it is a continuing concern of the Department, and it has placed a high priority on its activities for water supply and conservation--a priority second only to controlling soil erosion on cropland. USDA said it has several programs within its various agencies which support water conservation activities, ranging from providing seasonal regional agricultural water supply forecasts to requiring metering devices for water systems. Accordingly, six of the President's 1978 water conservation-related initiatives were addressed to the Department.

USDA pointed out several actions it took to implement the initiatives that it believes are worthy of particular note, including the following:

Interior also pointed out that the Principles and Standards against which water projects are evaluated will be replaced during 1983. It said the draft Principles and Guidelines being prepared by the Working Group on Water of the President's Cabinet Council on Natural Resources and the Environment will provide for water conservation.²

Environmental Protection Agency

EPA told us it shares our concerns with clean water and its significant impact on the physical health of our citizens and its economic impact on the Nation. EPA believes that well thought out and flexible water conservation programs are necessary for increasing our ability to conserve our water resources. In explaining its current policy regarding water conservation, EPA said:

"* * * President Reagan's Federalism program provides that States select and develop their own priorities, and fund programs based on each State's decisions. Water conservation is one issue area that requires such ranking by the States. In this way, States may address water conservation issues as States perceive their needs."

The agency said that based on the 1978 Presidential initiatives, it along with other Federal departments and agencies developed new conservation programs and revised existing ones. EPA served as lead agency to coordinate a review of appropriate programs of EPA, HUD, Commerce, and USDA for possible modification that would encourage water conservation in grant and loan programs for water supply and wastewater treatment.

Regarding changes in its own program areas made in response to the initiatives, EPA told us that the Construction Grants Program Regulations, issued September 27, 1978, required most construction grantees to conduct a cost-effectiveness analysis of wastewater flow reduction as part of the planning phase. The analysis was to include cost-effectiveness of flow reducing measures including public education, pricing and regulatory changes installation of low-flow fixtures in new and old residences, changes in plumbing or building codes to require water saving devices, including water meters, in residential and commercial establishments. Estimates of water and energy savings

²The Secretary of the Interior announced on March 1, 1983, that the President had signed the "Economic and Environmental Principles and Guidelines" for water project planning, and that they would become effective in July 1983.

regions and through construction item specifications. Guidance for construction criteria, water conservation management, water usage reporting, and other items is being categorized in various handbooks. These handbooks, according to GSA, should soon be distributed in their final form. GSA told us that its current activities include the following.

- Water usage practices are reviewed by management review teams from its central office in regional visits.
- Water consumption is reported for regions and GSA nationwide to the Department of the Interior and disseminated to GSA regions.
- Any water use criteria to be used in retrofitting existing facilities or in new construction are to be described in the Design and Construction Quality Standards, now being developed.
- It will continue contingency preparation and water use reduction actions and incorporate them in the Buildings Management Handbook for Energy Conservation.
- It will incorporate inclusive plumbing criteria and specifications for GSA buildings/facilities in the draft Quality Standards for Design and Construction or the Public Building Service Guide Specification--Plumbing Fixtures and Trim, respectively (the Guide Specification is a completed document).

Department of the Interior

Interior did not answer our specific questions regarding the actions it took to implement the President's 1978 initiatives nor the status of those actions. Instead it presented a statement of the Department's current water conservation policy.

Interior told us that the Bureau of Reclamation, the major water resources development and management agency of the Department, requires explicit provisions for water conservation in all water contracts. The contracts, it said, also provide for a regular 5-year review of cost and payment data to assure appropriate adjustments in rates and repayment requirements, and that recent contracts for industrial water use are particularly reflective of conservation pricing.

Also, according to Interior, Federal assistance in water short areas is an established practice of the Bureau of Reclamation through the continuing responsibility for project operations. Bureau technical personnel are available for advice and consultation upon request by State agencies and water-using organizations.

1978 initiatives, and that it intensified its interest in and requirements for conservation of scarce resources as a result of the initiatives. The research effort was directed at finding ways to reduce residential water use, and its results were used in carrying out the Presidential initiative entitled "Water Conservation in Housing Assistance Programs."

According to HUD, the research program has addressed collecting data on water use; identifying and documenting effective water conservation programs in operation, developing testing procedures which could lead to improved conservation methods and better fixtures and appliances, and supporting the writing and adoption of testing and material standards for the use of industry, building code organizations, and local governments. According to HUD, significant research activities in the past 4 years include:

- A joint research activity with the National Bureau of Standards to develop baseline technical information on water use by various types of plumbing fixtures. This helped develop testing and evaluation procedures and standards for water closets and shower heads.
- A project, begun in October 1982, to look at the actual performance of various approaches to water conservation being instituted in several cities.

HUD told us in October 1982 that water conservation is being added as an eligible rehabilitation activity in the Community Development Block Grant regulations, which are expected to be published in the near future. Also, HUD said that through the use of its "Minimum Property Standards" and other notices and instructions, it has encouraged the use of water saving devices and other water conservation measures throughout the federally supported housing and community development programs. Also, HUD told us that it has joined with other Federal agencies to encourage State and local participation in planning and implementation of Federal water projects in order to ensure that projects are responsive to their concerns, that cost of all services provided by water projects should be paid for by the direct beneficiaries of these services, and that the pricing of water services to the users reflects the real costs.

OTHER FEDERAL ACTIVITY

Another development that has had an affect on the Federal Government's involvement with water conservation activities concerns the issuance of two executive orders in September 1981. Executive Order 12319 terminated the River Basin Commissions' activities and Executive Order 12322 directed that water resources project plans be sent to OMB for the technical reviews

would be calculated and projected for a 20-year period. A program to implement those flow reduction measures found to be cost-effective would be considered. The goal of this conservation effort was to form the basis to reduce construction and grant costs.

EPA also told us that a flow reduction handbook was produced and distributed to communities during 1981. Among other things, this handbook was intended to show how cost and benefits of flow reduction programs are calculated; what household savings can be achieved by different flow reduction measures; and examples of successful flow reduction efforts of communities. In addition, EPA said it expanded funding for its section 214 public information program (authorized by the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 et. seq.) on water conservation and use. In addition to the handbook, EPA said that the program supported 10 publications, 5 films, 14 local workshops, and 2 national conferences on water conservation.

Reflecting the current policy on Federal involvement in water conservation, EPA efforts have diminished. For example, EPA told us that its section 214 program is greatly reduced. No new water conservation education efforts are underway, and no future conferences or workshops on water conservation are contemplated. The construction grant regulations have been revised to simplify and expedite the grants process; however, the water conservation/wastewater flow reduction analysis remains a required component of an approved facilities' plan. Existing regulations on EPA's Water Quality Management Program identify water conservation as a planning activity under section 208 of the Federal Water Pollution Control Act Amendments of 1972.

According to EPA, State plans will identify, where appropriate, conservation needs and practices necessary to achieve and maintain water quality standards and to ensure efficiency in municipal wastewater treatment. However, according to Federal budget documents, this section has not been funded since fiscal year 1981.

EPA pointed out that although the proposed water quality management regulations do not explicitly identify water conservation as an eligible planning area under section 208, grantee agencies may continue to address water conservation related to their overall water quality programs authorized under sections 205(j), 205(g), and 106 of the Act.

Department of Housing and Urban Development

HUD told us that it had initiated a water conservation research program within the Department prior to the President's

Federal Government should be involved in supporting research activities, ensuring that conservation techniques are considered as alternatives to federally financed projects, and providing pricing incentives to State and local governments such as cost-sharing for construction of projects and full-cost pricing for water supplied by the Federal Government.

A representative of the National Water Resources Association believes that the Federal Government is doing everything it can to conserve water, and it should not mandate policy to the States. The Federal Government, he believes, should work more closely with States in the research area as well as provide financial and technical assistance.

The former Executive Director of the National Water Commission--a group that, in 1973, issued a comprehensive study on the major water issues in this country--agrees with the direction of the current Federal water conservation policy. He said that past policy ran into acceptance problems because it defined conservation in terms of demand reduction, in lieu of project construction. Also, he explained that States, especially those in the West, perceived water conservation regulations as interference with their rights to regulate water use. The current policy, he believes, appropriately includes project construction activities in the overall construction philosophy.

Finally, in testimony given in July 1982 before the House Committee on Public Works and Transportation's Subcommittee on Water Resources, the Executive Director and General Counsel and a member of the Board of Directors of the Interstate Conference on Water Problems (ICWP) expressed a view that a comprehensive national water policy is needed, which addresses State water and related resources problems. This policy, they said, should be the result of comprehensive national, not primarily Federal, efforts and must recognize the States' primary role in water management, a strengthening of States' capabilities to manage water policy with more flexibility in the Federal Government's response to States. They emphasized that primary authority and responsibility for water management functions must rest with the States and, in some cases, delegated interstate or intrastate agencies. ICWP supported the concept of Federal technical and financial assistance to States in the development of water conservation technical assistance programs.

STATE AND LOCAL CONSERVATION EFFORTS

Several studies and reports show that State and local governments have instituted actions aimed at conserving water. These efforts range from issuing permits or licenses that limit water users' withdrawals of water from either surface or ground-water sources to campaigns designed to educate citizens on the benefits of sound conservation practices.

formerly performed by the WRC. The Commissions and the Council were established under the Water Resources Planning Act of 1965 to encourage comprehensive regional planning. We reported previously in May 1981 and May 1982 that the efforts undertaken pursuant to the Act have been largely ineffective because the Council and the Commissions had neither the level of responsibility nor the authority necessary to enforce their planning decisions.

Section 210 of the Reclamation Reform Act of 1982, enacted on October 12, 1982, imposes an obligation upon water districts to adopt a water conservation program and a timetable for implementation. The Act authorizes and directs the Secretary of Interior to enter into memorandums of agreement with those Federal agencies having capability to assist in implementing water conservation measures to assure coordination of ongoing programs. Such memorandums, according to the Act, should provide for involvement of non-Federal entities such as States, Indian tribes, and water-user organizations to assure full public participation in water conservation efforts. As of February 1983, Interior had issued interim guidelines to implement these conservation provisions. Final regulations are expected by September 1983.

REACTIONS TO FEDERAL DIRECTION ON WATER CONSERVATION

All of the numerous associations and individuals knowledgeable about water issues with whom we talked (see app. II for descriptions) agreed with the current administration's water conservation approach. They said water management is a State responsibility and that the Federal Government should not preempt nor undermine the States' management efforts. Also, they agreed that water prices that are more reflective of the market value of water will encourage sound water conservation and management practices. They saw a Federal role in research and in providing State and local governments with financial and technical assistance.

For instance, an official of the Western States Water Council said it formally opposed past Federal requirements that contracts for the delivery of water from Federal and federally assisted projects include water conservation plans because the Council believed it was an infringement on States' rights. He added that even though mandatory requirements have been withdrawn, water conservation will continue to be an important issue--perhaps as a means of foregoing or delaying capital expenditures.

A representative of the Conservation Foundation said that water conservation is a State and local responsibility but the

State Survey" in September 1982, that sought to identify State roles and responsibilities in six key policy areas. The objective was to gather information that would help States prepare for the proposed new federalism with respect to financing and managing water resources projects. The report included information obtained from five States--Georgia, Kentucky, North Carolina, Pennsylvania, and Virginia.

With regard to water conservation, the report concluded that all of the States surveyed encourage water conservation at various levels of involvement. Specifically, Kentucky informally encourages conservation through a low-key educational effort. Virginia has one full-time individual who works with local communities in promoting the use of conservation. Pennsylvania's 3 year old program stresses conservation at the community level--sponsoring workshops and distributing information, and providing direct technical assistance for the design and implementation of water conservation programs at the local level. For the last 3 years, North Carolina has encouraged leak detection and the development of local conservation plans. Georgia and North Carolina both require the use of water conservation devices in new or modified developments. Pennsylvania and Virginia have the power to restrict water use during times of emergency. Pennsylvania's governor, during the most recent severe drought, chose to delegate the responsibility for imposing water use restrictions to the local level through locally developed rationing plans approved by the State Emergency Management Agency.

In November 1982, the National Conference of State Legislatures issued a report entitled "Water Resources Management: Issues and Policy Options," which concluded that adoption of water conservation policies has been hindered by two factors (1) water has traditionally been an inexpensive commodity, and most urban areas have used declining block rates for water supply, which discourages water conservation and (2) there is a widespread public perception that conservation means doing without some necessity and is accompanied by a reduction in economic growth. The report discussed the advantages of several water conservation techniques for municipal/residential, industrial, and agricultural settings. The report presented case studies discussing State and local water conservation initiatives and experiences in California, Maryland, New Jersey, and Arizona. Among the results shown in the report are the following.

--The California Department of Water Resources estimated a savings of 58,000 acre/feet of water and the energy equivalent of 1.3 million barrels of oil through a program that distributed toilet and shower devices to about 30 percent of the States' households.

In June 1982, the Corps of Engineers' Institute for Water Resources³ and the Commonwealth of Pennsylvania's Bureau of Resources Programming participated in a joint effort to improve the understanding of the States' long-term capabilities in water supply/conservation planning and management. One of their objectives was to inventory State water supply/conservation programs. Each of the 50 States was asked to provide information on the status of its water supply planning efforts--33 reported having such a plan either completed or in the draft stage. Ten of the 33 plans included a water conservation component. The study also gathered information on the number of States with active water conservation programs. Fifteen States reported having full-time programs--9 Eastern, 4 Mid-Central, and 2 Western States. The average age of these programs was 3 years.

More than half the States reported that they provided educational and technical assistance. Eighteen States distributed educational materials, mostly to the general public--2 directed the materials to schools and municipal officials, and 6 targeted it to water supply purveyors. Seventeen States provided water conservation training and education programs, mostly designed for municipal and industrial conservation. Five of the 17 States reported that they provided programs for agricultural water conservation. Twenty-nine States reported they provided technical assistance to various groups, including municipal water purveyors, agricultural users, citizen groups, and business and industry.

In addition, the study results showed that 17 States encouraged municipal water purveyors to develop drought contingency plans, and 15 States had water conservation demonstration projects, which included landscape gardens, irrigation, and institutional and municipal demand reduction programs. Regarding the use of innovative technologies in their water conservation programs, eight States reported using cloud seeding/weather modification, but only three were using innovative irrigation techniques and three were using leak detection practices. Only one State reported using water recycling/reuse as a water conservation technique.

The Council of State Governments issued a report entitled "Water Resources: State Roles and Responsibilities: A Selected

³The Institute for Water Resources was established in 1969 to carry out a mission that includes developing new planning methodology, conducting policy analyses and managing national planning studies for the Office of the Chief of Engineers; presenting training programs related to water resources planning; and consulting on water resource planning problems confronting the Corps' division and district offices.

Status of State Water Conservation Programs

	<u>Pub. Ed./Info.</u>	<u>Plumbing Code</u>	<u>Retrofitting</u>	<u>Metering</u>	<u>Leak Detection</u>	<u>Rate Structure</u>	<u>Contingency Planning</u>	<u>Reuse & Recycling</u>	<u>Outdoor Use</u>	<u>Groundwater Management</u>	<u>Industrial Use</u>	<u>Agricultural Use</u>	<u>Govt. Bldg/Grant Require.</u>
AL	////						////						
AK				////						////			
AZ	////			////						////			
AR		////								////			
CA										////			
CO				////						////			
CT	////									////			
DE										////			
FL	////									////			
GA		////								////			
HI		////								////			
ID		////								////			
IL							////						////
IN				////						////			
IA										////			
KS								////		////			
KY										////			
LA										////			
MA	////						////			////			////
MD			////		////		////			////			////
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ND	////			////				////		////			
NH										////			
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UT	////									////			
VA								////		////			
VT										////			
WA							////			////			////
WI	////									////			
WV	////									////			
WY		////		////				////		////			

State

State Enacted Program
 Enacted Study Proposed Plan
 Partial State Program
 No State Program

Source: "Survey of Water Conservation Programs in the Fifty States. Model Water Conservation Program for the Nation" Environmental Policy Institute, August 1982.

- As the result of pricing structure changes in two Maryland counties, single-family residences using more than 500 gallons of water per day during the summer months decreased from 11.4 percent in 1977 to 6.5 percent in 1980.
- Imposition of an increasing rate schedule to determine water bills in East Brunswick, New Jersey, resulted in an 8-percent consumption reduction during 1978, and a 19-percent reduction during 1981, a period of severe drought.
- Tucson, Arizona, experienced a 23-percent reduction in water use during summer months for single family residences by adopting a new water rate schedule as well as instituting a consumer awareness program.

The report also stated that as of 1979, 536 wastewater reuse projects existed in the United States, as compared to 430 in 1971. These are broken down by type of reuse as shown below.

<u>Type of reuse</u>	<u>Number of projects</u>	
	<u>1971</u>	<u>1979</u>
Agricultural/landscape irrigation	400	470
Industry	15	29
Groundwater recharge	10	11
Fish propagation, recreation, other	<u>5</u>	<u>26</u>
Total	<u>430</u>	<u>536</u>

According to the report, wastewater reuse projects were operating in 27 States in 1979. California had the largest number of projects (244), followed by Texas (125), Arizona (36), and New Mexico (22). These four States accounted for nearly 80 percent of the wastewater reuse projects.

In November 1982, the Environmental Policy Institute (EPI), the research arm of the Environmental Policy Center (a national organization active in environmental issues), released a report on a survey it conducted of water conservation programs in 50 States. The survey was performed under contract to the Bureau of Reclamation. In its report, EPI analyzed each State's response against 13 categories of activity it considered relevant to water conservation. EPI concluded that much more can be done by the States. A summary of the report's findings follow.

The administration approach relies on State and local decisionmakers solving their own water supply problems in the manner that makes the most economical sense for their particular situations. More time and experience are needed to properly assess the effectiveness of this approach.

In June 1982, the Western States Water Council circulated a questionnaire to each of its 12 member States as a first step toward preparing a policy document on the proper role of water conservation in western water resource management. Water conservation was defined for the questionnaire's purpose as reduced withdrawals or depletions accomplished through such things as greater efficiency or reduced demand--the definition did not include water storage. Among other things, the States were asked to describe their water conservation efforts. Eleven of the 12 States responded to the questionnaire.

Eight States reported having no formal water conservation programs but rely on the Appropriations Doctrine to establish the best use of their water. That Doctrine basically provides that the first user to put water to beneficial use has the prior right to use the water with the unused portion being subject to other or future appropriations.

According to the Council's Research Analyst, California has the most comprehensive and active water conservation program that combines the conjunctive use of ground and surface waters. Arizona, in June 1980, enacted new legislation establishing a system of groundwater rights and providing for its management. The Department of Water Resources was created and given authority to prepare water conservation plans in four large urban areas. Surface water allocations still are controlled by the Appropriations Doctrine. Nevada reported that it has a conservation plan, but no staff or money to implement it.

OBSERVATIONS

While Federal agencies are continuing many of the efforts instituted to implement the President's 1978 water conservation initiatives, the current administration has made some basic changes to the underlying philosophy of water conservation. It believes water conservation is not a goal in and of itself, but it is one of many possible solutions to water supply problems. It believes that State and local governments should decide how to solve their own water problems with little, if any, interference from the Federal Government. The Federal role, it believes, is to help with financial and technical assistance.

The administration espouses to a "free market" approach to solving water problems--an approach in which water, water project development, and conservation are allowed to find their own relative values. In addition, the administration believes that the Federal, State, and local governments should share the financial burden of building water projects that solve State and local problems. And, that the price of water provided from existing federally built projects should more closely reflect its market values.

"Ground Water Overdrafting Must Be Controlled" (CED-80-96, Sept. 12, 1980).

"Congressional Action Needed to Provide A Better Focus on Water-Related Research Activities" (CED-81-87, June 5, 1981).

"Water Issues Facing The Nation: An Overview" (CED-82-83, May 6, 1982).

GAO WATER CONSERVATIONRELATED REPORTSJANUARY 31, 1976 - DECEMBER 31, 1982

"Better Federal Coordination Needed To Promote More Efficient Farm Irrigation" (RED-76-116, June 6, 1976).

"Ground Water: An Overview" (CED-77-69, June 6, 1977).

"Water Resources Planning, Management, and Development: What Are The Nation's Water Supply Problems and Issues" (CED-77-100, July 28, 1977).

"More And Better Uses Could Be Made of Billions of Gallons of Water by Improving Irrigation Delivery Systems" (CED-77-117, Sept. 2, 1977).

"Municipal and Industrial Water Conservation -- The Federal Government Could Do More" (CED-78-66, Apr. 3, 1978).

"Better Water Management And Conservation Possible -- But Constraints Need to be Overcome" (CED-79-1, Oct. 31, 1978).

"Review Of The President's June 6, 1978, Water Policy Message" (CED-79-2, Nov. 6, 1978).

"Reuse Of Municipal Wastewaters and Development of New Technologies--Emphasis and Direction Needed" (CED-78-117, Nov. 13, 1978).

"Water Resources And The Nation's Water Supply: Issues and Concerns" (CED-79-69, Apr. 13, 1979).

"Ways To Resolve Critical Water Resources Issues Facing The Nation" (CED-79-87, Apr. 27, 1979).

"Desalting Water Probably Will Not Solve The Nation's Water Problems, But Can Help" (CED-79-60, May 1, 1979).

"Water Supply For Urban Areas: Problems in Meeting Future Demand" (CED-79-56, June 15, 1979).

"Water Supply Should Not Be an Obstacle to Meeting Energy Development Goals" (CED-80-30, Jan. 24, 1980).

"Improvements Are Needed in USDA's Soil And Water Resources Conservation Act Reports" (CED-80-132, Sept. 3, 1980).

National Water Commission (NWC)

The NWC was established by provisions of P.L. 90-515, approved September 26, 1968. The duties were to: (1) review present and anticipated national water resource problems, make projections of water requirements, and identify alternative ways of meeting these requirements; (2) consider the economic and social consequences of water resource development; and (3) advise on such specific water resource matters as referred to it by the President and Water Resources Council.

The Council of State Governments (CSG)

The CSG was established in 1933 as a joint agency of State governments to improve coordination and communication of pertinent issues, including water resources, between the States and the Federal Government.

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WATER ORGANIZATIONS CONTACTEDDURING STUDYWestern States Water Council (WSWC)

The WSWC consists of 12 member States and was created in June 1965 to accomplish effective cooperation in water resource program planning among those States.

The Interstate Conference on
Water Problems (ICWP)

The ICWP, established in 1959, is a national association of State, interstate, and intrastate water resource agencies concerned with water resource administration and related matters. The purpose is to facilitate cooperation, consultation, and exchange of information among these officials and agencies as to the conservation, use, development, and administration of water and related land resources and the laws governing such matters.

Environmental Policy Center (EPC)

The EPC is a national conservation organization formed in 1974 that specializes in energy and water resource issues. Its purpose is to promote the safe, clean use of coal, oil and gas; energy and water conservation; and the protection of prime farmlands. The research arm of this organization is the Environmental Policy Institute (EPI).

National Water Resources Association (NWRA)

The NWRA is an association made up of States and other water users from the 17 Western States and Hawaii. It was established over 50 years ago to promote efficient water resource use and development.

Institute for Water Resources (IWR)

The IWR was established in 1969 as part of the U.S. Army Corps of Engineers. Its mission includes: developing new planning methodology; conducting policy analyses and managing national planning studies; presenting training programs related to water resource planning; and consulting on water resources problems confronting the Corps' divisions and district offices.

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