

DOCUMENT RESUME

07668 - [C3128226]

released 11/13/78

Review of the President's June 6, 1978, Water Policy Message. CED-79-2; B-114885. November 6, 1978. Released November 13, 1978. 8 pp. + 5 appendices (34 pp.).

Report to Sen. Edmund S. Muskie, Chairman, Senate Committee on Budget; Sen. Henry Bellmon, Ranking Minority Member; by Elmer B. Staats, Comptroller General.

Issue Area: Water and Water Related Programs (2500);
Environmental Protection Programs (2200).

Contact: Community and Economic Development Div.

Budget Function: Natural Resources, Environment, and Energy;
Water Resources and Power (301).

Organization Concerned: Office of Management and Budget; Council on Environmental Quality; Department of the Interior.

Congressional Relevance: House Committee on Interior and Insular Affairs; Senate Committee on Energy and Natural Resources; Senate Committee on Budget. Sen. Edmund S. Muskie; Sen. Henry Bellmon.

Authority: Fish and Wildlife Coordination Act (16 U.S.C. 661). National Historic Preservation Act (P.L. 89-665). Endangered Species Act of 1973, as amended (P.L. 93-205). Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901). Safe Drinking Water Act of 1974. Watershed Protection and Flood Prevention Act. Water Resources Planning Act of 1965. Federal Water Pollution Control Act. 42 U.S.C. 300f. 42 U.S.C. 1962. 33 U.S.C. 1251. Executive Order 11988.

The President's June 6, 1978, water policy message contained the following objectives: improved planning and efficient management of Federal water programs to permit the construction of water projects that are cost-effective, safe, and environmentally sound; a new national emphasis on water conservation; enhanced Federal/State cooperation; and increased attention to environmental quality. He also issued directives outlining action to be taken by Federal agencies in implementing his policy initiatives and establishing a timetable for completion. Findings/Conclusions: The water policy is a progressive attempt to reform water resources development practices, but some of the objectives may not be met by the initiatives. For example: proposed principles and standards need to be more specific; the proposal that the Water Resources Council (WRC) perform an independent water project review may not achieve the desired results because the WRC is not independent of agency influence; project selection criteria require identification and clarification; and Federal/State cost-sharing inconsistencies and inequities should be addressed. Recommendations in the message relating to the following were supported: modifications to financial assistance and housing assistance programs, encouragement and assistance for water conservation, and changes in irrigation repayment and contract

procedures. Areas not addressed by the policy include: the need to establish a clearinghouse for water conservation practices involving municipal and industrial water supplies, the need to solve constraints which impede implementation of better water management, and the need to better define the Federal role in promoting better water management. Also, greater priority should be given to water quality issues. (HTW)

REPORT BY THE

8226

Comptroller General

OF THE UNITED STATES

Review Of The President's June 6, 1978, Water Policy Message

The President's water policy is a positive attempt to reform existing water resources development practices.

The proposals involve Federal programs, water conservation, Federal/State cooperation in water management, and environmental protection. GAO agrees that reforms in these areas are necessary, but some initiatives did not go far enough and other areas needing reform were not addressed.

The Senate Committee on the Budget requested that GAO review the President's message.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-114885

The Honorable Edmund S. Muskie, Chairman
The Honorable Henry Bellmon, Ranking
Minority Member
Committee on the Budget
United States Senate

We have examined the administration's water policy reform proposals in accordance with your August 5, 1977, request, and our subsequent discussions with your office. The President's water policy message, delivered to the Congress on June 6, 1978, contained objectives and initiatives concerning Federal programs, conservation, Federal/State cooperation, and environmental protection. On July 12, 1978, the President signed a series of directives outlining action to be taken by Federal agencies in implementing his policy initiatives and establishing a timetable for completing the necessary actions.

In our opinion, the President's water policy is a progressive attempt to bring about much-needed reform in current water resources development practices. If the objectives and initiatives stated for the water policy are realized during implementation, many of the problems with existing programs will be remedied. However, we believe some of the objectives may not be met by the initiatives.

WATER POLICY REVIEW

In his environmental message of May 23, 1977, the President directed the Office of Management and Budget (OMB), the Council on Environmental Quality (CEQ), and the Water Resources Council (WRC), under the chairmanship of the Secretary of the Interior, to conduct, in consultation with the Congress and the public, a review of the present Federal water policy and to develop options for reform. The President stated that water conservation was to be the policy's cornerstone. Major topics under consideration were identified in a series of issue and option papers published in the July 15 and July 25, 1977, issues of the Federal Register.

POLICY OBJECTIVES AND INITIATIVES

The President's water policy is to achieve four basic objectives:

- Improved planning and efficient management of Federal water programs, which will permit the construction of necessary water projects that are cost effective, safe, and environmentally sound.
- A new national emphasis on water conservation.
- Enhanced Federal/State cooperation in water policy and in planning.
- Increased attention to environmental quality.

To improve Federal water resource programs, the President proposed the use of new criteria and uniform procedures for the computation of project costs and benefits with an independent agency review to assure that projects are planned in accordance with the principles and standards. ^{1/} He also proposed a new cost sharing program to give States a more meaningful role in water project's designs and decisions and yet protect small States from undue financial burdens.

To establish water conservation as a new national priority, the President directed all Federal agencies to incorporate water conservation requirements in all applicable programs and proposed legislation to allow States to charge more for municipal and industrial water from Federal reservoirs, provided that the additional revenue is returned to the municipality.

To enhance Federal/State cooperation, the President proposed grant programs totaling \$50 million to help States plan for their water needs and implement water conservation programs. He also proposed a task force with State, local, and Federal officials to examine water-related problems and to strengthen the partnership that the water policy had begun.

^{1/}The principles and standards establish Federal water resources planning objectives, a plan formulation process, and guidelines for the computation of benefits and costs.

To protect the environment, the President directed the Federal agencies to enforce environmental statutes more effectively, to fund environmental mitigation plans at the same time projects are being built, and to increase State cooperation in protection of instream flows and ground water resources.

RESULTS OF OUR EVALUATION

We examined the policy in light of our experience in past years with the programs which the policy directly affects. We have also commented on the lack of water quality emphasis in the policy.

It was not our objective to conclude definitively about the proposal's overall merits and weaknesses. Rather, our goal was to point out our concerns about its key features and important issues which also need to be addressed to develop a comprehensive water policy.

Our views are presented in summary form. Additional details are contained in the appendixes to the report.

Federal program initiatives

Principles and standards revisions: The policy's proposed reforms of the principles and standards are a positive step toward improving the planning, effectiveness, and coordination of Federal water resources programs. However, to be completely effective, the revised principles and standards must be specific enough to assure consistent interpretation among the many water resources agencies in developing benefit-cost analysis, and the agencies must revise their implementing instructions and review procedures. (See app. I, pp. 1 and 2.)

Wastewater treatment construction projects use a large portion of the Federal water budget, but the Environmental Protection Agency (EPA) is not required to economically justify them under the principles and standards. While we agree with EPA that there are problems associated with applying the principles and standards to these projects, we still believe their costs should be justified in terms of expected benefits. (See app. I, pp. 2 and 3.)

The proposal to include water conservation and non-structural alternatives in the principles and standards is valid, and we endorse the change.

Independent water project review: We agree that the system needs change to assure development of a more objective and impartial benefit-cost analysis. The water policy message proposal that WRC perform an independent review is an improvement; however, it may not achieve the desired results. WRC includes the Secretaries of the Departments under which the water resources agencies are located and is chaired by the Secretary of the Interior; therefore, WRC is not independent of member agencies' influence. We believe that there are several other alternatives for achieving greater independence and thus more objective and reliable benefit-cost analyses. Alternative approaches include strengthening OMB's role or establishing an independent agency or review board to either prepare or review the analysis for all agencies. (See app. I, pp. 3 and 4.)

Project selection criteria: Although most of the criteria listed in the water policy message are not completely new, we believe that specifically identifying them is a good idea. However, the administration should further clarify the use of these criteria by defining how they are to be applied. (See app. I, pp. 4 and 5.)

At least three of the considerations identified--conservation, nonstructural measures, and cost sharing--relate directly to areas that were emphasized in the overall water policy message. Identifying these as specific considerations will probably result in a more conscientious effort by the agencies to ensure that they are reflected in the planning process.

Cost sharing: The water policy message proposed that States be required to contribute a 10-percent cash share for projects with vendible outputs (and participate in their revenue) plus 5 percent of costs for other purposes. Because of the large cost of some projects, the President also proposed an annual cap on the States' contribution for each project. These actions are designed to

--involve States more heavily in water resources development decisions and

--eliminate certain biases with structural and non-structural flood damage reduction measures.

There are, however, cost sharing inconsistencies and inequities which the policy did not address--including the

many variations in cost sharing requirements of the various Federal water resources programs. (See app I, pp. 5 to 8.)

Water conservation initiatives

Several conservation initiatives responded to our earlier reports--particularly to our recommended changes in an agency's policies and procedures. We believe, however, that our broader recommendations and matters we identified for future study have not yet been adequately addressed.

We have recommended in the past and continue to support the following actions recommended in the water policy message (see app. II, pp. 9 and 10):

- Modifying financial assistance programs for municipal water supply and sewer systems to require appropriate community water conservation programs as a condition of loans and grants.
- Modifying housing assistance programs to require use of water reducing technologies in new buildings as a condition of receiving 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.
- Implementing certain changes in irrigation repayment and contract procedures under the existing authorities of the Bureau of Reclamation.

Broader areas not addressed by the policy include:

- The need to establish a clearinghouse for water conservation practices involving municipal and industrial water supplies. (See app. II, p. 12.)
- The need to solve constraints which prevent or impede the implementation of better water management and conservation practices. (See app. II, pp. 12 and 13.)
- The need to better define the Federal role in promoting better water management and conservation. (See app. II, pp. 13 to 17.)

Initiatives to enhance Federal/State cooperation in water management

The water policy message emphasized that the States are the focal point for water resources management. The President proposed to accomplish this by increased funding of planning grants, establishment of conservation grants and a cooperative task force, and proposed actions to remove controversies regarding Federal- and Indian-reserved water rights. In implementing the initiatives designed to enhance Federal/State cooperation, we believe consideration should also be given to the benefits of establishing a clearinghouse to support the conservation grant program (see app. III, p. 18), and of establishing policy guidance on the Federal role in solving the emerging urban water supply problems. (See app. III, pp. 19 and 20.)

The President's sense of urgency to have reserved water rights inventoried and quantified will also enhance cooperation with the States. However, legislation may be necessary to resolve many of the questions and issues surrounding the reserved water rights controversy. (See app. III, p. 19.)

Environmental protection initiatives

Increased attention was given to environmental quality through four initiatives concerning environmental statute enforcement, floodplain management, the Soil Conservation Service, and Federal/State cooperation with instream flows and ground water protection. We generally agree with these initiatives but note that

- the proposal to fund environment mitigation efforts concurrently with project construction may be inappropriate (see app. IV, p. 22) and

--the issue of water quality was not adequately addressed.

Water quality

The water policy briefly addressed water quality issues, but failed to adequately emphasize the importance of water quality. We believe that more consideration needs to be given to (1) the effects of waste disposal on water supply, (2) the use of water resources projects to help complement the Safe Drinking Water Act, (3) the elimination and reduction of non-point ^{1/} sources of pollution, (4) the recycling and reuse of municipal and industrial water, and (5) the need for water quality and supply interface. (See app. V, pp. 28 to 34.)

We believe there needs to be more national priority given to restoring and enhancing water quality. Thus, we believe the water policy message should have addressed the importance of water quality and given water quality equal priority with the water quantity issues.

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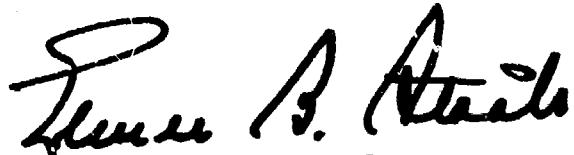
At your request, we did not obtain written agency comments. The matters covered in the report, however, were discussed with agency officials responsible for the water policy; their comments are incorporated where appropriate.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from the date of the report. At that time we will send copies of this report to appropriate Senate and House Committees; the Director, Office of Management and Budget; and the heads of departments and

^{1/}Sources of water pollution which are difficult to pinpoint or measure--sediment, acid mine drainage, pesticides, and other pollution carried into streams by runoff from rainstorms--currently produce more than half the pollutants entering the Nation's waterways.

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agencies directly involved. We will make copies available to interested organizations as appropriate and to others upon request.

A handwritten signature in black ink, appearing to read "James B. Atchafalua". The signature is written in a cursive style with a large initial "J".

Comptroller General
of the United States

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FEDERAL PROGRAM INITIATIVES

The water policy message stated that changes in agency planning, reviewing, and cost sharing for water resources projects were essential. We believe that the proposed reforms are a positive step toward improving the planning, effectiveness, and coordination of Federal water resources programs. However, we do not believe that the proposed change to provide an independent water project review will fully accomplish its objective. In a recent report ^{1/} we addressed the principles and standards and the need for an independent project review. The following discussion relates our report to the water policy proposals in these two areas. We also believe that the project selection criteria needs further clarification, cost sharing inconsistencies still remain, and wastewater treatment construction project costs need to be better justified in terms of expected benefits.

PRINCIPLES AND STANDARDS

We support the proposed changes, which include

- publishing a new planning manual for project benefit and cost determinations,
- integrating water conservation into the principles and standards, and
- changing the principles and standards to require consideration of nonstructural plans.

The Water Resources Council (WRC), a policy and coordinating body, established the principles and standards for planning water resources projects, effective in 1973, which superseded Senate Document 97 (the governing criteria for benefit-cost analysis prior to 1973). The new standards were developed to help establish uniform procedures for more accurate benefit-cost analysis. However, we found that the principles and standards were not specific enough to assure consistent interpretation in developing procedures and recommendations for benefit-cost analysis.

^{1/}"An Overview of Benefit-Cost Analysis for Water Resources Projects--Improvements Still Needed," (CED 78-127, Aug. 7, 1978).

We endorse the President's directive to WRC and believe that the planning and justification process for water resources projects will be greatly improved if

--the revised manual is specific enough to ensure consistent interpretation in developing benefit-cost analysis and

--the agencies revise their implementing instructions and review procedures to assure compliance with the principles and standards.

We also endorse the changes proposed to (1) integrate water conservation into the objectives of the principles and standards, which we recommended in April 1978, ^{1/} and (2) require more emphasis on nonstructural solutions to water-related problems.

Need for wastewater treatment projects to be included under the principles and standards

In a draft of this report we proposed that the water policy message should have included a requirement for wastewater treatment projects to be economically justified under the principles and standards. However, EPA officials objected to this proposal when discussing our draft report. While we agree that there are problems associated with applying the principles and standards to wastewater treatment construction projects, we still believe the cost of these projects needs to be justified in terms of expected benefits.

We reported in 1976 that many expensive municipal advanced wastewater treatment facilities are being constructed even though they may not be the most effective or efficient means for achieving water quality goals. ^{2/} The capital cost of waste treatment facilities increases dramatically with levels of treatment beyond that provided by secondary wastewater treatment facilities. In 1972 EPA data indicated that it could cost at least five times as much to remove the last 15 percent of the pollutants as to remove the first 85 percent. We also reported in May 1978

^{1/}"Municipal and Industrial Water Conservation--The Federal Government Could Do More," (CED 78-66, Apr. 3, 1978).

^{2/}"Better Data Collection and Planning Is Needed to Justify Advanced Waste Treatment Construction," (CED 77-12, Dec. 21, 1976).

that because available Federal funding for municipal wastewater treatment projects falls far short of national needs, available funds should be directed to those projects where improvements to water quality can be optimized. 1/

Although EPA officials disagree with using the principles and standards to justify wastewater treatment construction projects, they do agree that there is a need during the water quality management planning process to better analyze project costs in relationship to benefits.

PROPOSED APPROACH TO AN
INDEPENDENT WATER PROJECT REVIEW
MAY NOT SUCCEED

Although reform of the principles and standards will improve project justification, change is also needed in the system to insure the development of more objective and impartial benefit-cost analysis. According to the water policy message the plan is to create, by Executive order, a project review function within WRC to assure that impartial reviews will be conducted. We do not believe, however, that the proposed approach will result in a fully independent review process.

Since most Federal agencies are part of the executive branch and are funded by the legislative branch, it is difficult to establish an agency or board which is completely independent of both branches. Because subjective judgment is a critical part of water resources project benefit-cost analyses, independence is important for a reliable analysis.

The current system of analyzing, authorizing, and appropriating funds for water resources projects is subject to agency self-interest and political influence. The agencies' major mission is the construction and operation of water resources projects. Project funding levels and possibly their very existence depend on maintaining current and dynamic construction programs.

The National Water Commission's June 1973 report, "Water Policy for the Future," as well as earlier study commissions dating back to 1949 recognized the need for and recommended an independent review process. We agree. In

1/"Secondary Treatment of Municipal Wastewater in the St. Louis Area--Minimal Impact Expected," (CED 78-76, May 12, 1978).

our recent overview report we concluded that although the proposal to have WRC perform the project review should result in more consistent, uniform benefit-cost analyses, we do not believe that the approach will provide the independence needed to correct the problem primarily because WRC lacks such independence. ^{1/} WRC includes the Secretaries of the Departments in which the water resources agencies are located and is chaired by the Secretary of the Interior.

Our overview report on benefit-cost analysis concluded that there are several other alternatives for achieving more objective and reliable benefit-cost analyses. Alternative approaches include strengthening OMB's role or establishing an independent agency or review board to either prepare or review the analysis for all agencies. It should also be noted that OMB will have to allocate personnel positions and the Congress must provide a supplemental appropriation before the proposed review unit can be established.

PRESIDENTIAL PROJECT
SELECTION CRITERIA CLARIFIED

The criteria which is to form the basis for Presidential decisions for funding and authorizing water resource projects, although in most cases not really new, has been clarified and more specifically spelled out. These criteria include:

- Projects should have net national economic benefits unless there are environmental benefits which clearly more than compensate for any economic deficit.
- Projects should have widely distributed benefits.
- Projects should stress water conservation and appropriate nonstructural measures.
- Projects should have no significant safety problems.
- There should be evidence of active public support.
- Projects will be given expedited consideration where State governments assume a share of costs over and above existing cost sharing.

^{1/}"An Overview of Benefit-Cost Analysis for Water Resources Projects--Improvements Still Needed," (CED 78-127, Aug. 7, 1978).

- There should be no significant international or intergovernmental problems.
- Where vendible outputs are involved, preference should be given to projects which provide the greater recovery of costs.
- The project's problems assessment, environmental impacts, costs, and benefits should be based on modern conditions.
- Projects should comply with all relevant environmental statutes.
- Funding of mitigation of fish and wildlife damages should be provided concurrently and proportionately with construction funding.

We believe that these are reasonable criteria, but the President should further clarify the process and define how these criteria will be applied. For example, weighting factors could be applied to the various criteria to define which ones are more important than others in deciding which projects will be recommended.

At least three of the criteria identified--conservation, nonstructural measures, and cost sharing--relate directly to areas that were emphasized in the overall water policy message. Identifying these criteria for specific consideration will probably result in a more conscientious effort by the agencies to ensure the criteria are considered in their planning process.

The President stated that he will use the criteria to base his decisions on annual water projects funding and on authorization and appropriations bills--including the selection of new planning and construction starts. These criteria were used in selecting the fiscal year 1979 projects which the President has recommended for new planning and construction starts.

COST SHARING IMPROVED BUT INEQUITIES STILL EXIST

The water policy message proposed preparation of a legislative proposal to allow States to participate more actively in project decisions and to remove financial biases against nonstructural flood control measures. Our past reports have not specifically addressed the effect that cost sharing would have on Federal water resources projects. Our comments on cost

sharing, however, are based on an understanding gained through discussions with agency officials and a familiarity with various studies on the subject. Our future work will include efforts to further clarify the issues involved with cost sharing.

We agree with the proposal to encourage greater State participation in planning and initial financing of water resources projects. These changes should have many positive effects; however, the proposed changes raise new questions and fail to address the recognized problems of inconsistencies among agencies and repayment requirements.

New cost sharing proposed

The water policy message proposed that States contribute a 10-percent cash share for projects with vendible outputs plus 5 percent of other purposes and an annual project-by-project cap on the State contribution of one-fourth of 1 percent of the State's general revenue. This proposal should be beneficial because it could discourage construction of some less economical projects.

Present policies can often lead to unwise development, tempting States as well as project beneficiaries to request projects they would be less willing to support if their own money were involved. The cost sharing proposal is a positive step toward correcting that situation; however, increasing State financial participation does not untangle the existing quagmire of inconsistencies which presently exists.

Financing, cost sharing, and repayment requirements for Federal and federally assisted water resources projects and programs have evolved over the years as new agencies, programs, and project purposes have been authorized. As a result, there are many variations in these requirements among agencies as well as among programs with similar purposes and objectives. Consequently, this situation has caused confusion, encouraged local interests to negotiate among agencies for the most favorable arrangement, and fostered inequitable treatment of the direct beneficiaries as to how and when they repay their share of project costs.

We believe these issues should have also been addressed in the water policy message.

Cost sharing proposal's effect
on navigation projects

We believe that the cost sharing proposal could be very difficult to administer for navigation projects; also, defining the extent that States will benefit could be very confusing and controversial. According to the proposed change, benefiting States would be required to provide 5 percent of the costs associated with navigation project construction. However, how the various States' share would be determined for a navigation project on one of the Nation's major tributaries has not been defined. Many different States would benefit from a project, but determining exactly which States benefit and the degree that they benefit--and getting their concurrence--could be very difficult, if not impossible. We believe this question will have to be addressed in the forthcoming cost sharing legislation.

Cost sharing proposal's effect
on flood control projects

The water policy message proposed that existing cost sharing rules be modified to require, in addition to the 10-percent/5-percent proposal, a 20-percent contribution for either structural or nonstructural Federal flood damage reduction measures.

Equalizing the cost sharing percentage on structural and nonstructural flood control measures should help eliminate the bias which exists toward structural measures. This is the most positive step taken toward eliminating inconsistencies in cost sharing methods, because current cost sharing arrangements for structural flood control measures also vary among agencies and among structural means (for example, levees as opposed to reservoirs).

Normally the cost of major reservoirs allocated to flood control--including operation and maintenance--are entirely funded by the Federal Government. The policy for local protection projects (such as levees, flood walls, or channel improvements) requires that State and local interests provide land, easement, and rights-of-way, and generally bear the costs of operation and maintenance. Nonstructural flood control measures require a 20-percent contribution and can include a combination of cash, land, easements, and rights-of-way.

According to the National Water Commission study, cost sharing inconsistencies have sometimes resulted in the local interest negotiating for the project which is most desirable

from a local financial standpoint. ^{1/} However, the project may not be the most economical or the best solution to the problem. For example, the best and most economical means of providing flood protection for a community may be a nonstructural measure or levee system. But because local cost sharing is required for nonstructural measures and levees but not for reservoirs, the community may reject the nonstructural measures and bargain in favor of a more costly reservoir.

The proposed action should provide incentives for the Federal and non-Federal interest to negotiate and agree on flood control projects that will be most desirable for both the Nation and the local area, rather than the project that is most beneficial from the local financial viewpoint.

^{1/}"Water Policies for the Future," June 1973.

WATER CONSERVATION

Over the years we have issued several reports on Federal efforts to promote better surface and ground water management and conservation. Essentially, these reports have shown that there are opportunities to make better use of existing water supplies, but Federal efforts to take advantage of these opportunities have been stymied because no Federal agency had taken a leadership role in determining (1) the extent and causes of water use inefficiencies, (2) ways to overcome constraints to the implementation of improvements, and (3) the role the Government should play in solving the related problems.

The water policy initiatives concerning conservation include several recommendations we made in prior reports, particularly those where we recommended changes in an individual agency's policies and procedures. We believe, however, that our broader recommendations and matters we identified for future study (such as the proper role the Government should play in promoting better surface and ground water management and conservation) have not yet been adequately addressed.

In addition, our more recent reports have shown that substantial constraints exist to the implementation of improved surface and ground water management practices and that certain Federal agencies were not analyzing and seeking solutions to these constraints where they could. We believe that potential solutions for overcoming constraints impeding improved water use practices exist and that these potential solutions should be evaluated by the pertinent Federal agencies.

CONSERVATION AND GROUND WATER
INITIATIVES--THE CONSTRAINTS
AND POTENTIAL SOLUTIONS

The water policy message included several initiatives for increasing the emphasis on conservation in Federal water resources programs:

- Modifying financial assistance programs for municipal water supply and sewer systems to require appropriate community water conservation programs as a condition of loans and grants.
- Modifying housing assistance programs to require use of water reducing technologies in new buildings as a condition of receiving 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.
- Implementing certain changes in irrigation repayment and contract procedures under the existing authorities of the Bureau of Reclamation.

Water policy initiatives we agree with

In May 1975 we reported that improvements were needed in the Bureau of Reclamation's procedures and practices for determining an irrigator's ability to pay the Federal cost of water resources projects allocated to irrigation. 1/ We found that irrigators' ability to pay is determined by ascertaining the estimated difference in farmers' income with and without an irrigation project and involves many subjective evaluations--and each can substantially affect the amounts determined to be available for repayment. We recommended that the Bureau develop and implement (1) uniform guidelines for more precisely calculating the irrigators' ability to pay and (2) provisions in future contracts for periodically redetermining irrigators' ability to pay and the resulting irrigation repayment rates. Both these recommendations have been included in the President's water conservation initiatives.

In another report we concluded that various Federal programs offer numerous opportunities for encouraging municipal and industrial water conservation. 2/ For instance, Federal agencies (1) provide funds for water resources planning to assure efficient water use, (2) construct dams and reservoirs to increase the supply in various sections of the country,

1/"More Effective Procedures Are Needed For Establishing Payment Terms and Development Periods For Irrigation Projects," RED-75-372, May 23, 1975).

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

(3) construct and operate public buildings and military and civilian housing and finance housing programs where water conservation programs could be undertaken, and (4) provide grants to local entities for constructing wastewater treatment facilities, the size and cost of which could be reduced if conservation were practiced. We made the following recommendations to individual Federal agencies, each of which were similar to ones included in the President's water conservation initiatives:

- The Water Resources Council (1) require that State and river basin water resources plans consider water conservation and (2) revise the "Principles and Standards for Planning Water and Related Land Resources" to include water conservation.
- The Bureau of Reclamation, Soil Conservation Service, and Corps of Engineers, require water use plans from purchasers of water supply or storage space in reservoirs they construct.
- Require that water conservation devices be installed in new housing that the Government participates in.
- Require water saving devices in designing, constructing, leasing, operating, and maintaining Federal office buildings by the General Services Administration.
- Implement the use of water saving devices in the construction and operation of military facilities by the Department of Defense and hospitals by the Veterans Administration.

Potential ways to overcome constraints to the implementation of better water management and conservation practices

In prior reports we recognized that there were substantial constraints (such as water rights law, the rights of existing contractors, and others) which would affect the Federal agencies' ability to implement recommended changes. Consequently, our more recent reports have concentrated heavily on identifying these constraints and potential solutions for overcoming them.

For example, the April 1978 report on municipal and industrial water conservation describes several techniques, such as domestic water saving devices, metering, pricing, leakage control, water pressure control, education campaigns,

and industrial conservation. We concluded that a major constraint to the implementation of these techniques was a lack of knowledge about their effectiveness. We found that although these techniques generally are believed to free additional water supplies for other purposes, prevent or delay construction of costly water supply and treatment facilities, and decrease the amount of energy needed for pumping, treating, and heating water--many had not had their effectiveness thoroughly evaluated. In addition, no centralized data bank or clearinghouse on water conservation exists, and such a clearinghouse could be useful in providing water conservation information.

We recommended that the Chairman, Water Resources Council, take the lead in establishing an interagency task force of Federal and non-Federal water resources agencies. Its purpose would include the development of Federal objectives, policies, and action plans for a clearinghouse for water conservation practices involving municipal and industrial water supplies. Although the Council's Director generally agreed with our recommendations and indicated that the President's initiatives would further elaborate on the action to be taken, the initiatives do not specifically address this issue.

In a recent report, we concluded that certain Bureau of Reclamation efforts to promote better water management and conservation had been unsuccessful because they had not sought solutions to constraints which prevent or impede the implementation of better water management and conservation practices. ^{1/} We identified the following five major categories of constraints which we believe impede Reclamation's efforts:

- Legal right to water saved by irrigators.
- High cost and repayment requirements of projects for improving irrigation efficiencies.
- Adverse effects on other water users, such as ground water pumpers and downstream irrigators, from water saving practices.

^{1/}"Better Water Management and Conservation Possible--But Constraints Need To Be Overcome," (CED-79-1, Oct. 31, 1978).

--Rights of irrigators under long-term contracts which do not provide for adjustments of water rates and quantities.

--Lack of data on the nature and extent of the Federal role for achieving irrigation efficiencies.

We believe that the Bureau of Reclamation should analyze and seek solutions to identified constraints in its study efforts. Also, that Reclamation should examine each of the following potential solutions for overcoming constraints impeding improved water use practices:

--Water banking. 1/

--Consideration of basinwide benefits resulting from improving irrigation systems in Reclamation loan determinations for such improvements.

--Improvement of access to contract terms and development of conservation-oriented standard contract language.

The water policy initiatives do not specifically address constraints to the implementation of better water management and conservation practices nor potential ways to overcome them.

NEED TO BETTER DEFINE THE FEDERAL ROLE IN PROMOTING BETTER WATER MANAGEMENT AND CONSERVATION

Two principal areas have been identified in our prior reports as needing better definition of the Federal role. These areas are ground water management and promoting irrigation efficiencies.

Ground water management

Many places across the Nation are using ground water from an aquifer faster than the water is replenished. To a

1/Water banking is a concept whereby a water user could temporarily transfer his right to unneeded water to an intermediary or broker who would in turn make the water available for withdrawal or sale to a water user who needs it. Water banking has potential for overcoming major constraints, such as legal rights to water saved, adverse effects on other water users, and cost constraints.

lesser extent soil subsidence (lowering of the land surface resulting from reduced ground water) and saltwater seepage into fresh ground water reservoirs are also occurring. Presently, ground water supplies about 20 percent of all fresh water used in the United States. The estimated storage capacity of aquifers is nearly 20 times the combined volume of all the Nation's rivers, ponds, and other surface water. Although the ground water supply in the 48 contiguous States is plentiful, little more than one-quarter of it--equivalent to about 10 years' annual precipitation--is available for use because it cannot be extracted with present techniques.

The ground water problem is particularly acute in the High Plains region of western Texas/eastern New Mexico. The fast-dwindling and increasingly expensive 1/ supply of ground water, with no other local water source identified, may soon cause profound economic and social consequences there. Similar problems are developing in the ground water aquifer which extends from this region to as far north as the Platte River in Nebraska.

Ground water management, when it exists, aims to regulate ground water withdrawals and use of the water. In the Western States, emphasis has been on administering and protecting surface and ground water rights rather than the use of the water. More intensive ground water management generally occurs only after a locality has been faced with problems such as declining ground water levels, soil subsidence, or saltwater entering the fresh water. State water rights laws and lack of sufficient geological and hydrological data prevent more intensive management. Federal, State, and local officials said that optimal water management would include using and managing surface and ground water as a unit.

In ground water management, the aquifer or aquifer system must be described in detail, and the quantity and quality of the water supply must be continuously monitored. The U.S. Geological Survey has provided much of this type of data to managers through its Federal/State cooperative program; however, more data is needed. State and local officials say that because of tight State and local budgets, the Government will have to develop the needed data if it is to be provided.

1/As ground water is depleted, it is necessary to dig deeper wells. The cost of pumping water increases significantly as the well gets deeper.

We discussed the issues described above in a report issued in June 1977. 1/ We raised the following questions about ground water management, conservation, and use:

- Should the Government take a more active role in ground water management? If so, what should its role be and what agency or agencies should be responsible?
- Should future construction of Federal water resource projects depend on whether the States show that their laws provide for integrating surface and ground water rights?
- How crucial is an inventory of water rights to proper management of ground water? Should the Government be responsible for inventorying these rights?
- Should the Government systematically identify areas with ground water problems to assign priorities for Federal assistance in obtaining ground water data?
- Should there be a national water policy requiring all Federal agencies involved in water planning or construction activities to require use and management of surface and ground waters as a unit? If so, how should such policy be implemented?
- Should water be transferred from one river basin to another to reduce ground water pumping or to recharge aquifers?
- Is enough being done to identify and prevent the intrusion of saltwater into ground water?
- Should (or can) Federal programs be devised which provide incentives to decrease dependence on irrigation in water-short areas? How important is irrigation to the national economy? Is it feasible to compensate for decreased farm production in such areas by increased farm production in areas not requiring irrigation?

The water policy message did not resolve these matters, nor did it establish a mechanism for their eventual solution. We believe these questions involve basic policy and warrant consideration by the Congress and study by the Federal and State agencies responsible for planning and administering water programs.

1/"Ground Water: An Overview," (CED-77-69, June 21, 1977).

Irrigation efficiencies

The greatest potential, as well as the greatest need, for better water management and conservation is in the irrigated areas of the West. Crop irrigation accounts for over 80 percent of water consumption, most of which occurs in the arid and semiarid West. The water policy initiatives, however, do not adequately address the problem with irrigation efficiencies.

Irrigation is a relatively inefficient water use, since under present practices less than half the water delivered for irrigation is actually consumed by the crops. The remainder, which is excess to crop needs, may be absorbed by weeds, may oversaturate the lands (causing drainage problems), or may return to the supply system either in the ground water aquifers or at a downstream location, degraded in quality by minerals, fertilizers, sediment, and pesticides. These return flows may be used downstream for additional irrigation. In some cases, however, the water may return where it does not benefit potential users located between the point of diversion and the point of return, or it may require substantial additional amounts of energy to pump the water back to the surface.

Some techniques which could lead to productivity increases, that is, maximizing agricultural output per unit of water use, are the lining of water conveyance and distribution systems, more exact timing of water deliveries, avoiding overdeliveries, and using water savings methods such as drip and sprinkler irrigation systems. Other measures include suppressing reservoir evaporation, controlling unwanted vegetation (which consumes considerable water), and increasing yields without additional water through better crop varieties and fertilizers. Some techniques which could be effective, but are sensitive issues, are water-pricing policies which are a disincentive to excessive use such as (1) charging progressively higher rates as greater quantities of water are used and (2) eliminating or reducing Federal subsidies to recipients of irrigation water from Federal projects.

In two reports issued in June 1976 and September 1977 we identified many problems concerning the implementation of improved agricultural water management and conservation practices, and we made recommendations to the Secretaries of the Interior and Agriculture and the Administrator of the Environmental Protection Agency which, if properly implemented, should (1) determine the extent and causes of overirrigation, (2) identify ways to improve inefficient irrigation delivery systems; and (3) determine the role the Government should

play in solving the related problems. 1/ These agencies have established a task force to deal with these matters and they plan to issue a final report by May 1979.

Presumably, the task force report will have a substantial effect on the water policy initiatives concerning Federal programs for promoting agricultural water conservation if they accomplish their goals. Thus far, a June 1978 draft report by the task force's Technical Work Group contains information on the overall significance of the irrigation efficiency problems but does not adequately address the basic causes and applicable Federal role. Moreover, the water policy initiatives do not specifically address the task force efforts.

1/"Better Federal Coordination Needed to Promote More Efficient Farm Irrigation," (RED-76-116, June 22, 1976); "More and Better Uses Could Be Made of Billions of Gallons of Water By Improving Irrigation Delivery Systems, (CED-77-117, Sept. 2, 1977).

ENHANCED FEDERAL/STATE COOPERATIONIN WATER MANAGEMENT

To accomplish the goal of enhanced Federal/State cooperation in water management the President proposed

- increased funding of State water planning;
- creation of a matching grant program for water conservation, education, and research;
- establishment of a task force of Federal, State, and local officials to examine water-related problems, to help implement the policy initiatives, and to make appropriate recommendations; and
- steps to facilitate resolution of controversies surrounding Federal reserved water rights and Indian water rights.

The thrust of these initiatives is good; however, other factors need to be considered if Federal/State cooperation is to be enhanced, including

- the benefits of establishing a clearinghouse in support of the conservation grant program and
- the need to establish policy guidance concerning the Federal role in solving emerging supply problems.

PLANNING AND CONSERVATION
GRANT PROGRAM INITIATIVES

WRC currently administers a planning grant program authorized at \$5 million annually and has been funded from \$3 to \$5 million annually. The plan is to increase this program to \$25 million and to establish a \$25 million conservation grant program under WRC. Draft guidelines and legislation have been prepared and commented on by interested Federal, State, and local officials. The legislative proposals, however, have not been transmitted to the Congress.

In developing the conservation grant program we believe serious consideration should be given to incorporating provision for a conservation clearinghouse, as discussed on page 12. WRC has already agreed, in response to one of our reports, that a clearinghouse function is a logical element to technical assistance activities. 1/

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

WATER POLICY TASK FORCE INITIATIVE

We agree that an intergovernmental task force could be a good approach to enhance Federal/State cooperation. The task force, which will be made up of Federal, State, county, city, and other local officials, is to provide continuing guidance for implementing water policy reforms and is to ensure that the State and local role in the Nation's water policy is constant and meaningful.

FEDERAL AND INDIAN WATER RIGHTS

We endorse the policy initiative because for the first time it represents a comprehensive action program to inventory and quantify Federal- and Indian-reserved water rights. However, in a draft report we state that, in the final analysis, legislation may be necessary to resolve many of the questions and issues surrounding the reserved water rights controversy. ^{1/} Employing an administrative approach has certain advantages, even if legislation will eventually be necessary. For example, it should provide additional information on the (1) problems in defining and quantifying reserved rights, (2) feasibility or likelihood of negotiated settlements, and (3) nature and significance of disruptions to existing water users which may result from the assertion of the reserved rights. Information on the last matter would help the Congress make knowledgeable judgments if it wished to consider compensating those who may suffer loss by the exercise of reserved rights.

NEED FOR POLICY GUIDANCE
CONCERNING URBAN WATER
SUPPLY PROBLEMS

The water policy recognized that the States were particularly concerned with the deterioration of urban water supply systems, but offered no policy guidance or direction on alleviating the problems. We plan to study the problem and believe that the President should have established a process for developing Federal policy recommendations relating to this problem.

In the East and small old western towns there is a special concern about deteriorating urban water supply systems. It is not unusual for a city's central distribution system to be over 100 years old. These systems, ravaged by rust, nearby

^{1/}"Water Rights Reserved for Federal and Indian Reservations: A Growing Controversy in Need of Resolution," (CED 78-176).

construction, and water pressure much greater than anticipated when designed, are beginning to show signs of complete collapse.

Because urban water supplies are becoming more critical each year, the administration should recognize the need to make a policy statement concerning the problem. Over the next 2 years we will examine this issue to further define the problems, potential solutions, constraints to solutions, and the potential Federal role.

ENVIRONMENTAL PROTECTION

The water policy message included as one of its objectives an increased attention to environmental quality. The President said that the maintenance and improvement of environmental quality is a matter of continuing national concern. Federal decisions affecting water and related land resources need to reflect better attention to this concern, particularly when they have potential effects on important fish and wildlife resources, floodplains, wetlands, or historic and archeologic sites. According to the water policy message existing laws and administrative requirements intended to protect these resources are not now receiving adequate attention by Federal agencies.

ENVIRONMENTAL STATUTE ENFORCEMENT

The policy directed that the:

- Secretary of the Interior and other agency heads require full implementation of and compliance with the Fish and Wildlife Coordination Act, the National Historic Preservation Act, and other environmental statutes. Agencies requesting funding for new and ongoing projects and programs affected by these statutes will prepare project-by-project reports demonstrating compliance.
- Agency heads include designated funds for environmental mitigation in all project construction appropriation requests, and shall require funds for mitigation to be spent concurrently and proportionately with construction funds throughout the project's life.

Fish and wildlife

We reported in March 1974, that generally, wildlife conservation has not been considered equally with other features of water resources development. ^{1/} Our report concluded that the effects of water resource developments on wildlife can be equally considered through effective implementation of the coordination process mandated by the Fish and Wildlife Coordination Act (16 U.S.C. 661-666). We therefore support the President's initiatives to require agency heads to fully implement and comply with the act.

^{1/}"Improved Efforts Needed to Equally Consider Wildlife Conservation With Other Features of Water Resources Developments," (E-118370, Mar. 8, 1974).

National historic preservation

We support the efforts to require compliance with the National Historic Preservation Act (Public Law 89-665). In November 1977 we reported that the Department of Housing and Urban Development, EPA, the Department of Transportation, and the Army Corps of Engineers were either following the advisory council's historic preservation procedures and drafting internal regulations which paralleled those of the advisory council, or had developed internal procedures implementing the historic preservation and other environmental legislation. ^{1/} However, the agencies' accounting systems generally could not identify the actual costs to implement section 106 of the National Historic Preservation Act, or to mitigate adverse effects and/or perform archeological survey and salvage efforts.

Environmental mitigation funds

Our ongoing review of the implementation of the Endangered Species Act of 1973, as amended (Public Law 93-205) has shown that the Department of the Interior has prepared formal regulations implementing the various sections of this statute. However, full agency compliance is lacking--especially with section 7, which directs all Federal agencies to assure that their actions do not jeopardize endangered or threatened species or their critical habitats. We agree that agencies should demonstrate compliance with the act on a project-by-project basis in annual budget submissions. Based on the tentative results of our ongoing review, however, we are concerned with the proposal that agency heads include funds for environmental mitigation in all project construction requests and that they spend these funds concurrently and proportionately with construction funds. According to Department of the Interior estimates, it takes several years before the success or failure of a relocation can be determined. Although the water policy initiative is an improvement, it would seem more appropriate if funds could be spent before actual construction.

FLOODPLAIN MANAGEMENT ACTIVITIES

Despite efforts to control floods, 90 percent of the damage attributed to disasters in the United States is flood

^{1/}"Information on Federal and State Administration of the National Historic Preservation Program," presented to the Chairmen, the Subcommittee on General Oversight and Alaska Lands and the Subcommittee on National Parks and Insular Affairs, both from the House Committee on Interior and Insular Affairs (Nov. 4, 1977).

related. Since 1936 over \$9 billion have been spent on flood protection systems such as dikes, dams, levees, reservoirs, channel improvements, and watershed treatment. Yet the average annual loss from floods has been \$1.5 billion and could reach \$5 billion by 2020 if unregulated development of floodplains continues.

Structural solutions to flooding, such as those mentioned above, have not solved the problem and, in fact, may have contributed to it by encouraging floodplain development. Because the problem persists, nonstructural methods of floodplain management become increasingly important. We are reviewing how actively agencies are pursuing nonstructural alternatives.

To promote better floodplain management the water policy message directed that:

- Agencies are to expedite implementation of Executive Order 11988 on floodplain management.
- The Secretaries of Interior, Commerce, Army, and Housing and Urban Development are to improve flood protection through nonstructural means by directing use of existing Federal programs to enhance nonstructural flood protection, including land acquisition, where this is consistent with primary program purposes.

Executive Order 11988 requires responsible agencies to provide leadership and to take action (1) to reduce the risk of flood loss, (2) to minimize the effect floods have on human safety, health, and welfare, and (3) to restore and preserve the natural and beneficial values served by floodplains.

We believe that the floodplain management initiatives will improve the current situation, but other efforts are also required for these initiatives to be fully effective. Our past reports have concluded that Federal agencies need to

- evaluate flood hazards adequately,
- place greater emphasis on providing technical assistance,
- provide better monitoring and leadership of Federal flood control efforts,
- accelerate completion of flood insurance studies and rate maps, and

--monitor community efforts to adopt and enforce floodplain management regulations. 1/

In one report concerned with a predecessor Executive order on floodplain management, we recommended that agencies require their field offices to evaluate flood hazards in their programs, use the 100-year flood frequency criteria established by WRC, and suggest types of actions to be taken when properties are located in the 100-year floodplain. 2/ The new Executive order appears to address these recommendations.

Our report dealing with flood insurance studies and rate maps recommended that HUD take action to complete these studies by 1983. 3/ These studies should be completed as soon as possible to most effectively apply the Executive order in a floodprone community.

SOIL CONSERVATION SERVICE INITIATIVES

Under the water policy message the Soil Conservation Service (SCS) of the Department of Agriculture is required to take the following action, which we support:

- Continue working with the Fish and Wildlife Service (FWS) to make full application of the recently adopted stream channel modification guidelines.
- Seek further acceleration of land treatment measures prior to funding structural measures, including making appropriate land treatment measures eligible for Federal cost sharing where they directly contribute to control of soil erosion or water pollution.
- Establish requirements for periodic post-project monitoring to ensure implementation of land

1/"National Attempts to Reduce Losses From Floods By Planning For and Controlling the Uses of Flood-Prone Lands," (RED-75-327, Mar. 7, 1975); and "Formidable Administration Problems Challenge Achieving National Flood Insurance Program Objectives," (RED-76-94, Apr. 22, 1976).

2/"National Attempts to Reduce Losses From Floods By Planning For and Controlling the Uses of Flood-Prone Lands," (RED-75-327, Mar. 7, 1975).

3/"Formidable Administrative Problems Challenge Achieving National Flood Insurance Program Objectives," (RED-76-94, Apr. 22, 1976).

treatment and operation and maintenance activities specified in the work plan and to provide information helpful in improving the design of future projects.

Stream channel modification guidelines

SCS officials stated that SCS and FWS have jointly developed and adopted stream channel modification guidelines that set forth conditions under which channel modifications may be considered in watershed project planning. These guidelines will be used in the planning of all SCS projects which qualify for either technical, financial, and/or credit assistance under the authorities for flood prevention projects, small watershed projects, and resource conservation and development projects. Officials stated that the guidelines include provisions for maintaining and enhancing fish and wildlife resources as well as achieving other water management objectives.

Although we have not reviewed the guidelines, SCS officials stated that application of these guidelines should generally result in channel modification being used as a last resort measure for flood prevention after carefully considering all environmental impacts.

Land treatment measures

Under the initiative, SCS is to (1) encourage accelerated land treatment measures before funding structural measures on watershed projects and (2) make appropriate land treatment measures eligible for Federal cost sharing. This initiative is in line with our 1976 report concerning the Watershed Protection and Flood Prevention Act. ^{1/} SCS officials stated that they have modified their policy to require that 50 percent or more of the land above reservoirs be adequately protected from erosion before a proposed dam is installed. In the past, only the plans for land treatment were required before starting on the project. This new policy requires SCS to establish periodic post-project monitoring to insure implementation of land treatment and operations and maintenance activities specified in the work plan.

^{1/}Letter report to Congressman Clausen regarding the Watershed Protection and Flood Prevention Act (CED-77-13, Dec. 27, 1976).

Post-project monitoring

We issued two reports in 1977 which support the need for SCS to make sure that federally funded land treatment measures are properly installed and maintained. ^{1/} SCS officials stated that they are developing procedures and a reporting system which will assure proper accountability of land treatment measures applied with Federal funds. SCS is also considering whether to provide technical assistance funds that would establish a proper monitoring system. After installing the land treatment measures, the monitoring process would determine if such practices are actually providing the water quality and water conservation benefits that were planned in the watershed plan.

SCS officials said that they intend to provide Federal financial assistance for land treatment measures, but landowners must agree to operate and maintain land treatment practices for a period of time under a long-term agreement. SCS officials also said that they are proceeding on an environmental evaluation program planning system that may improve their ability to predict environmental impacts and future conditions resulting from specific project actions and to formulate and evaluate future environmental management plans. SCS is hoping that this system will develop methodologies that will improve overall water resources projects.

FEDERAL/STATE COOPERATION REGARDING
INSTREAM FLOWS AND GROUND WATER PROBLEMS

The water policy initiatives on Federal/State cooperation on instream flows voice concern that the failure of Federal water programs to consider the need to leave water in the stream (especially in the West) jeopardizes recreation, fish and wildlife, water quality, and aesthetics. The policy also stated that ground water management is essentially a State and local function. However, the absence of laws and procedures in many areas has created problems which have resulted in calls for Federal water resources development.

^{1/}"To Protect Tomorrow's Food Supply Soil Conservation Needs Priority Attention," (CED 77-30, Feb. 14, 1977); and a letter report on whether removal of conservation practices is becoming a problem in Iowa, especially after farms are sold to new owners (CED 77-63, May 17, 1977).

Instream flows

To obtain instream flow protection, the President has directed that (1) Governors be asked to work with Federal agencies to protect instream flows, (2) Federal agencies work closely with the States to improve the operation and management of existing projects to protect instream uses and needs, (3) proposals be made to amend authorizing legislation which now lacks provisions for streamflow maintenance, and (4) Federal planning and technical assistance be available to address and correct instream flow problems.

We agree in general with measures proposed by the President for instream flow protection. Present Federal policy provides for assessing and establishing the quantity of water necessary for maintaining adequate instream flows below proposed dams. This applies, however, only to new and planned projects. For projects already constructed, the use of stored water for instream flow requirements is often not provided.

Ground water

The President's policy statement directs Federal water resources agencies to assess ground water problems as projects are planned and to work closely with States and local governments to seek resolution of ground water problems. Ground water issues as well as our report on the subject were discussed in appendix II, pages 13 to 15.

LACK OF WATER QUALITY CONSIDERATION
IN THE WATER POLICY MESSAGE

The water policy message briefly addressed some water quality aspects, but failed in our opinion to adequately emphasize the importance of water quality. We believe water quality and water quantity are inextricably interwoven and need to be considered together in the national water policy. The water policy message mentioned the need to improve the protection of instream flows and to evolve careful management of the Nation's precious ground water supplies, but these areas were mentioned only briefly. More consideration needs to be given to the effects of waste disposal on water supply, the quality of water needed for drinking, the elimination and reduction of nonpoint sources of pollution, the recycling and reuse of water from municipal and industrial sources, and the interface of water quality and water supply management.

EFFECTS OF WASTE DISPOSAL ON
THE NATION'S WATER SUPPLY

To be fully comprehensive, the water policy message should consider and emphasize the effects waste disposal practices have on ground water. The relationship between waste disposal practices and the effects on ground water quality has generally been ignored.

Land disposal sites for wastes are often located in areas considered to have little or no value for other uses; sufficient concern is not given for the type of soil on which they are situated or their proximity to water resources, particularly ground water. Such improper siting, coupled with limited State enforcement of other standards and requirements, has resulted in ground water contamination in some heavily populated areas throughout the country. State and Federal efforts to prevent ground water contamination have been inefficient.

We recently reported that State programs to control waste disposal activities have been ineffective because, even though most States have enacted legislation governing waste disposal activities, they lack the staff and funds to adequately manage the programs. ^{1/} Acceptable alternative disposal sites are not always available to assure compliance

^{1/}"Waste Disposal Practices--A Threat to Health And The Nation's Water Supply," (CED 78-120, June 16, 1978).

with legislative requirements, and Federal financial assistance to the States has been limited.

Federal efforts should improve waste disposal practices, but these efforts do not affect ground water already contaminated. The Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901 et seq.) specifies a series of actions designed to close or upgrade all open dumps by October 1983. Effectively carrying out the Resource Conservation and Recovery Act of 1976 will significantly eliminate or minimize ground water contamination from new or upgraded existing sites.

However, the act does not address the potential threat to public health that exists because of ground water that is already contaminated by leachate, (a pollutant that results when water comes in contact with waste) or that may become contaminated as a result of older, closed disposal sites. When contaminated by leachate, little can be done to clean the ground water and any corrective measures that can be taken are expensive and technically difficult.

DRINKING WATER QUALITY

The drinking water supplied to most American homes today is generally considered good; however, a 1970 study indicates that water supply quality may be deteriorating. ^{1/} The high standards set by U.S. public water supply systems produced a steady decline in the number of outbreaks of waterborne disease and illness. But that decline stopped in 1951 and there are indications that it may have begun to rise. In addition, the Nation's water supplies are threatened by the careless use of hundreds of chemical compounds and the heedless disposal of toxic wastes.

The Safe Drinking Water Act of 1974 (42 U.S.C. 300 f to j-9) provides for setting national drinking water quality standards. The Congress authorized EPA to support State and local community drinking water programs to provide financial and technical assistance and to undertake research and study efforts. The law provides the means for expanding the scope and level of water utility service and for improving the quality and dependability of drinking water for future generations of Americans.

^{1/}National Community Water Supply Study of 1970.

Most of the emphasis for providing safe drinking water will obviously be provided by the Safe Drinking Water Act of 1974. We believe, however, that the administration should set forth policy whereby various water projects can help complement the Safe Drinking Water Act provisions to

- protect the public's drinking water supply;
- regulate drinking water as to taste, odor, and appearance;
- protect underground drinking water sources;
- undertake research and studies regarding health, economic, and technological problems of drinking water supplies with particular emphasis to studies of viruses in drinking water and contamination by cancer-causing chemicals; and
- survey the quality and availability of rural water supplies.

NONPOINT POLLUTION--AN EMERGING PROBLEM
TO WATER QUALITY

One of the real concerns with maintaining water quality is the increasing degree of water pollution that is being caused by nonpoint sources of pollution. We testified in July 1978 that at the rate funds are being authorized for nonpoint pollution, it will be impossible for many of the Nation's streams to meet the 1983 goal of being fishable/swimmable. ¹/ Some policy direction needs to be given in this area because of the lack of available funding. If the 1983 goals are too costly for the Nation to obtain, the administration needs to address what the national priorities will be and what quality of water the Nation can realistically obtain under funding and staffing constraints.

Nonpoint pollution, runoffs from agriculture and forest lands, mining and construction sites, and urban area storms are, by their nature, difficult to measure, control, and eliminate. Nonpoint sources can contain a variety of

¹/Testimony of July 11, 1978, before the Subcommittee on Investigations and Review, House Committee on Public Works and Transportation, concerning EPA's water pollution control construction grant program.

pollutants--toxics from petroleum hydrocarbons, ammonia, heavy metals, nutrients, various minerals, acids from mine drainage, and sediment.

We reported in 1977 that nonpoint pollution accounts for possibly more than half the pollutants entering the Nation's waters, and costs to correct nonpoint pollution may be staggering. ^{1/} Federal and State officials agree that the 1983 water quality goals of fishable/swimmable waters cannot be attained for many areas of the Nation because of nonpoint pollution. For example, EPA's May 1976 report to the Congress on an inventory of the Nation's water quality, indicated that 37 States reported that some portion of their waters will not meet the 1983 goals because of nonpoint pollution. According to the National Commission of Water Quality, primary treatment and disinfection of urban runoff alone will cost approximately \$199 billion. For one State alone, \$1.3 billion is the amount the State has estimated it will need for soil conservation practices such as contour plowing, conservation tillage, grading of land, and terracing. Although it is obvious that controlling nonpoint sources of pollution will cost billions, only \$600 million has been authorized under the Clean Water Act of 1977 to assist owners of rural property to install the best management practices for long-term soil conservation to improve water quality by reducing runoff.

REUSE AND RECYCLING OF MUNICIPAL WASTEWATER TO CONSERVE WATER SUPPLIES

The reuse and recycling of both water resources and the valuable elements contained in various waste streams can play a vital role in improving the quality and quantity of the Nation's precious natural resources. The water policy message appropriately emphasizes the importance of making water conservation a national priority. Although the President plans to make water conservation measures a condition of EPA's wastewater treatment grant and loan program, we would like to see the implementation plan recognize the potential to conserve water through its reuse for industrial, municipal, and recreational purposes.

Historically, most projects applying wastewater to land are doing so to conserve water through reclamation

^{1/}"National Water Quality Goals Cannot Be Attained Without More Attention to Pollution From Diffused or 'Nonpoint' Sources," (CED-78-6, Dec. 20, 1977).

reuse for beneficial purposes because of existing or potential water shortages. These projects are generally located in the warmer, water-short areas where crop irrigation and landscaping as well as replenishing ground water aquifers are viable options for wastewater reuse much of the year.

Although industrial, municipal, and recreational reuse of wastewater is far less common than reuse for irrigation, reclaimed wastewater may be reused for industrial, municipal and recreational purposes. Only a few such projects, however, have been funded by EPA. Industries could reuse municipal wastewater to cool, boiler feed, wash, and transport materials, and as an ingredient for producing goods. Municipalities could reuse wastewater to supplement their potable supply by indirect methods, or to serve nonpotable purposes such as toilet flushing and lawn watering. Wastewater could also be reused for recreational purposes such as boating or fishing.

In a draft report we stated that EPA should help increase the acceptance and use of new or alternative wastewater reuse technologies by identifying the types of facilities and municipalities where new technology could be utilized effectively to show its potential scope of application. ^{1/} We also stated that EPA should designate a central group to analyze long-term wastewater treatment research needs.

Part of the reason the public sector is not inclined to increase its use of recycled wastewater relates to concerns about possible adverse health effects. The American Water Works Association issued a statement in 1973 discouraging the direct potable reuse of wastewater until research showed that it would not affect public health. State public health officials will not risk the unknown health hazards as long as good quality water is available. The Association is still against the direct potable reuse of wastewater; however, it considers it reasonably safe to use wastewater for potable purposes in short-term emergency situations, assuming proper treatment is provided.

According to a June 1976 University of California study, public opinion is also opposed to direct potable reuse. The study showed that more than 50 percent of those sampled were opposed to the use of reclaimed water for the highest contact

^{1/}"Reuse of Municipal Wastewater and Development of New Technology--Emphasis and Direction Needed," (CED 78-177).

purposes (drinking, preparation of food, canning vegetables, and so on).

COORDINATION BETWEEN WATER
QUALITY AND SUPPLY IS NEEDED

Today more than ever the United States needs to realize that water is not an unlimited and inexhaustible resource. Because (1) water demands and competition are escalating rapidly and (2) available supplies are dwindling, integrating water supply and water quality matters becomes increasingly important. Water of suitable quality must be available in adequate quantity at the times and places needed to satisfy all intended beneficial uses. And if this is to be done water resources planners and managers must recognize that water quality and quantity are interrelated elements of man's self-styled water supply and use pattern.

Water resources supply and quality planning are currently administered separately. Federal water supply and quality programs are authorized under two separate acts--the Water Resources Planning Act of 1965 (42 U.S.C. 1962 et seq.) and the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.). Even though EPA became a member of WRC in 1975, water quality is not being adequately interfaced with water supply planning or management.

We issued several reports that affect the need for integration of water supply and quality. In one report we pointed out that loss of water from inefficient irrigation delivery systems not only wastes water but the water that does return to the streams or rivers may be polluted by sediments and salts. 1/ In another report we show that more efficient use of water supplies can reduce the need for larger wastewater treatment plants. 2/ In yet another report we show that past practices for disposing waste on the land have contaminated ground water resources in some heavily populated

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

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

areas to the point of threatening public health. 1/ Thus, the Nation's water supply is not, in many cases, of sufficient quality to be used for drinking purposes. The report contains a number of cases that illustrate the degradation to ground water quality and how such degradation affects the quantity of water that can be used by homeowners.

1/"Waste Disposal Practices--A Threat To Health and The Nation's Water Supply," (CED 78-120, June 16, 1978).

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